

**RapidExam<sup>TM</sup>**  
**v3.0**  
**Deluxe**

**Technical Brief**

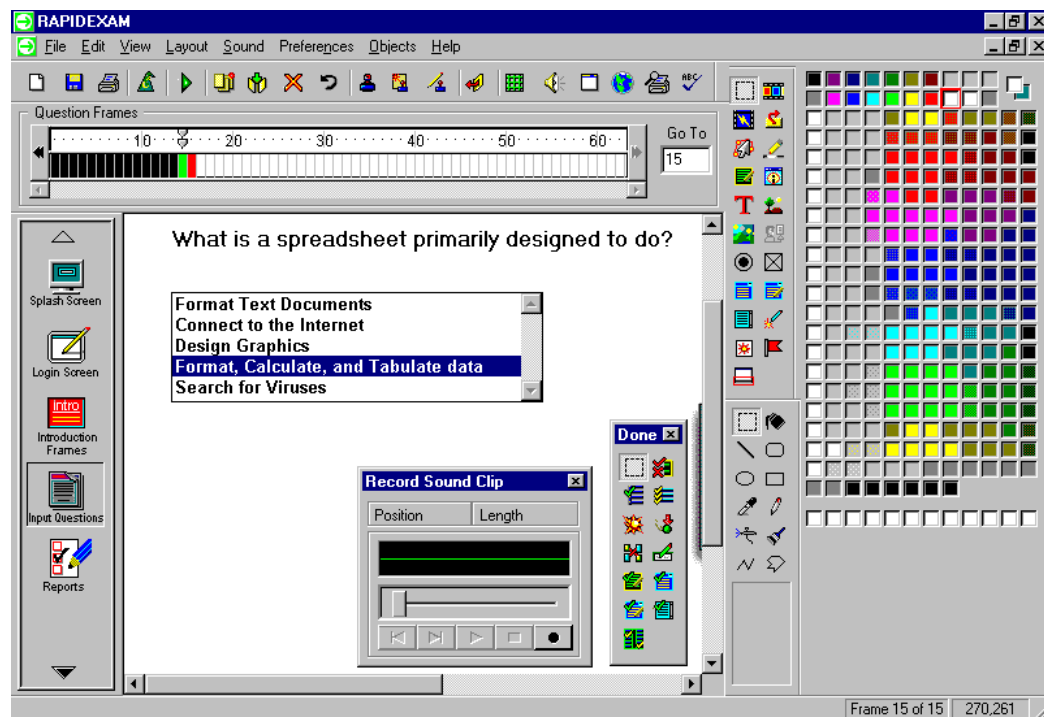
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## What is RapidExam?

**RapidExam v3.0 Deluxe** is XStream Software's 100% Programming-free Question-based Assessment Authoring technology. It enables developers to create, customize, and deploy full-fledged Question-based Assessments (including certifications, exams, proficiency tests, quizzes, questionnaires, surveys, etc.) with full scoring, tracking, and analysis/reporting capabilities.



**Figure 1: RapidExam Interface**

Developers may build assessments containing splash screens, login screens, pre-test introduction screens, 12 different question styles (including true or false, multiple choice, check list, hot spot, drag and drop, match list, fill-in-the-blanks, essay, combo box, edit combo box, list box, and matrix), built-in progress & scoring reports, exam achievement/completion certificates, and post-test ending feedback/content screens.

RapidExam files may be customized and enhanced with a large variety of interactivity and multimedia features, including graphics, audio, video, hyperlinks, status bars, animations, visual effects, security settings, and much more.

Once created, RapidExam files may be saved and deployed in a variety of different media formats, including EXM (native file format), Adobe Flash (SWF), XML, Executable (EXE), IMS QTI, SCORM, Sharable Content Objects (SCOs), and Printed Format. Files can be deployed over the Web, over a Local Area Network (LAN) or Wide Area Network (WAN), and on CD-ROM. Built-in streaming capabilities enable smooth web playback (with no additional hardware/software required).

RapidExam is a fully scalable software solution (in terms of both development and deployment). There is no limitation on the number of authors or end users. RapidExam files may be distributed royalty free (via CD-ROM, LAN/WAN, or Web) to any number of users without incurring any additional costs.

## Exam Components

RapidExam employs a consistent graphical interface that emphasizes simplicity. It streamlines the development process by facilitating a straightforward, step-by-step process:

1. Set **Global Options/Properties** for the exam.
2. Create a **Splash Screen**.
3. Create a **Login Screen**.
4. Create **Introduction** frames.
5. Create **Question** frames.
6. Select end-user **Reports**.
7. Create **Ending** frames.
8. Save the exam as a native **.EXM** file or in another available format (**.SWF**, **.XML**, **.EXE**, **SCORM**, **SCO**, or **IMS QTI**).

**OR**

Create a **Paper-based, Printed Exam** for distribution to students.

### Global Options/Properties

In RapidExam, a large variety of global options can be set to define certain characteristics and functionality for the entire exam. These options include the following:

- Controlling the size and border style of the exam playback window.
- Specifying whether the exam playback window will contain a title bar. If the developer chooses to include a title bar on the exam playback window, the developer may specify a variety of customization settings for the title bar, including specifying the title bar style, specifying the title bar color, specifying the title bar heading text, choosing a user-defined system menu icon (if any) for the title bar, and specifying which control buttons (if any) will be present on the title bar (Minimize, Maximize, and/or Close).
- Applying security options (to avoid cheating) – The Print Screen key may be disabled during exam playback, which prevents end users from taking unauthorized snapshots of exam content. The exam may be configured to fill the entire screen area during playback, which prevents any distractions from other screen areas. Task switching may be disabled during exam playback, which prevents the end user from using the mouse or keys to switch to another task or program window.
- Enabling end users to change the font size at runtime (which makes it easier for users who have trouble viewing smaller font sizes).
- Defining the number of questions (from the pool of available questions) displayed for a single exam session.

- Specifying whether the questions will be displayed sequentially or randomly at runtime.

If the questions are displayed sequentially, the developer may further define if each exam session will always consist of the same set of sequential questions beginning with the first question in the pool of questions (e.g., if 10 questions from a question pool of 50 are set to be displayed for a single session, questions #1 to #10 will always be displayed in each session) or if each exam session will consist of a different set of sequential questions from the pool of questions (e.g., if 10 questions from a question pool of 50 are set to be displayed for a single session, questions #1 to #10 will be displayed in the first session, questions #11 to #20 will be displayed in the second session, questions #21 to #30 will be displayed in the third session, etc.).

If the questions are displayed randomly, each question within the exam session will be randomly selected from the pool of available questions. A questioning history is maintained between exam sessions so that the end user is guaranteed not to experience any duplicate questions within a single session.

- Specifying the passing score for the exam.
- Specifying whether the exam will be timed. If the developer specifies a timed exam, he/she may specify the maximum number of minutes the end user has to complete the exam as well as the number of minutes the end user may spend on a single question. In addition, the developer may specify whether or not the exam ends when the time has elapsed. A countdown clock (analog or digital) may be displayed on the Status Bar so that the end user is always aware of how much time remains.
- Specifying the number of times a single end user can take the exam.
- Specifying difficulty categories – The developer may guarantee a consistent level of difficulty in an exam by assigning an estimated level of difficulty between 1 and 10 to each exam question. The developer may then specify the percentage of questions from each difficulty category that will be included in a single exam session.
- Defining custom exam sets and question sequences – In addition to the options for standard sequential and random question delivery, the developer may customize any number of unique exam sets for an exam, with each exam set containing a selected number of questions in a customized sequence. The developer may also specify the order in which the exam sets will be played.
- Specifying an external file (i.e., RapidBuilder file, RapidExam file, Performance Analyzer file, or another type of external file) or web page that will be automatically launched when the end user exits the exam.
- Specifying whether the system will check for any incomplete questions when the end user submits the exam. If the developer enables this feature, the system will check to see if there are any incomplete questions when the exam is submitted. If there is at least one incomplete question, a confirmation message will be displayed that will enable the user to decide whether or not to submit the exam with one or more questions incomplete.
- Specifying an exit playback warning message, which will be displayed if the end user attempts to exit the exam (by clicking a button or pressing <ALT + F4>) at any point during playback. This warning message gives the end user the opportunity to either confirm that he/she wishes to exit the exam or to cancel the action and resume playback.

- And more...

### **Splash Screen**

The developer may customize an opening **Splash Screen** for the exam. This is the first screen (or series of screens) that the end user will view when running the exam. It is typically used to display such information as the title of the course/exam, the name of the company or educational institution, logos, and other graphics, an introduction or overview message, etc.

The developer has full control over the layout and look of the splash screen.

### **Login Screen**

The developer may create a **Login Screen** for authenticating end users of the exam. At runtime, an end user will enter a valid user name and password in the login fields in order to gain access to the exam.

If the exam is a standalone exam (not registered in the web-based **XStream LMS**), then it is not necessary to include a **Login Screen** in the exam. However, if a **Login Screen** is present in the exam, the end user is required to enter “superuser” as the user name and password in order to gain access to the exam.

If the exam is a managed exam (registered and tracked in the web-based **XStream RLMS**), then a **Login Screen** must be present in the exam so that end users (who have been assigned to the exam by an administrator) can access the exam by entering a valid user name and password. The login fields will automatically link to **XStream LMS** in order to check the entries against the information in the database and authenticate the user.

The developer has full control over the layout and look of the login screen.

### **Introduction Frames**

The developer may add **Introduction Frames** to the exam. These frames represent the screens that are displayed after the **Splash Screen** and/or **Login Screen** but before the **Questions**. **Introduction Frames** are ideal for presenting pre-exam information to the end user, such as introductory text, background information, exam guidelines and rules, multimedia exhibits, etc.

The developer has full control over the layout and look of each introduction screen.

## **Input Questions**

The developer may add an unlimited number of questions to the exam. Each question is placed on a separate screen. The developer has full flexibility to define the overall look and functionality of each question screen by performing a variety of editing tasks, including customizing a background color or image for each screen, specifying the height and width of each screen, linking each screen to an audio file or recorded sound clip (which will play automatically when the question is displayed at runtime), and much more.

RapidExam supports twelve (12) different question styles:

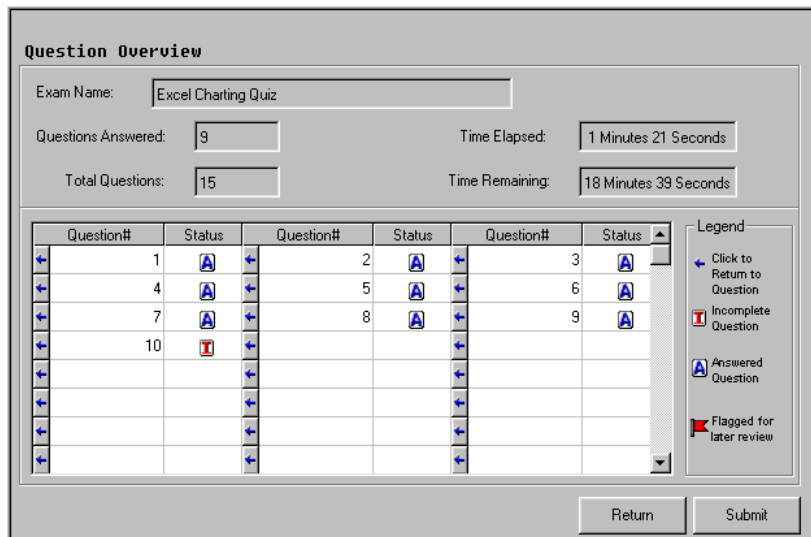
- **True or False** – A question in which a statement is identified as being either true or false.
- **Multiple Choice** – A question in which a single correct answer must be selected from a list of possible answers.
- **Check List** – A question in which several correct answers must be selected from a list of possible answers.
- **Hot Spot** – A question containing active regions that are clicked by the end user (e.g., click the picture of the white cat).
- **Drag and Drop** – A question containing selected regions that are dragged from one location and dropped onto another (e.g., drag the text labels featuring names of computer parts onto the correct areas of the computer diagram).
- **Match List** – A question in which items in one column are matched with those in another column. Items are matched by drawing a line from one item to another (e.g., match each word with its corresponding picture).
- **Fill-in-the-Blanks** – A question containing one or more validation text fields where the end user types the answer(s), which are compared against pre-defined validation strings specified by the developer.
- **Short Answer** – A question containing one or more validation text fields where the end user types the answer(s), which are compared against pre-defined keywords (and associated words/synonyms) specified by the developer. This is ideal for creating essay questions that are scored based on keyword analysis of multi-sentence response.
- **Combo Box** – A question in which the end user provides an answer by selecting one or more listed items from a Windows-style combo box.
- **Edit Combo Box** – A question in which the end user provides an answer through a Windows-style combo box, either by selecting a listed item from the combo box drop-down list or by typing an answer in the text field portion of the combo box. This question type is similar to the **Combo Box** question type, but it gives the end user the extra capability of typing the answer in the text field if it is not present in the drop-down list.
- **List Box** – A question in which the end user provides an answer by selecting one or more listed items from a Windows-style list box.

- **Matrix** – A question in which the end user provides an answer by making selections from multiple rows/groups containing either radio buttons or check boxes. In each row, the user needs to select either a single answer (if radio buttons are present) or multiple answers (if check boxes are present). The **Matrix** question style essentially enables the developer to combine the **Multiple Choice** and **Check List** question styles.

## Reports

When creating an assessment in RapidExam, the developer has the option to include two (2) different user-level reports as part of the assessment. The following reports are included by default:

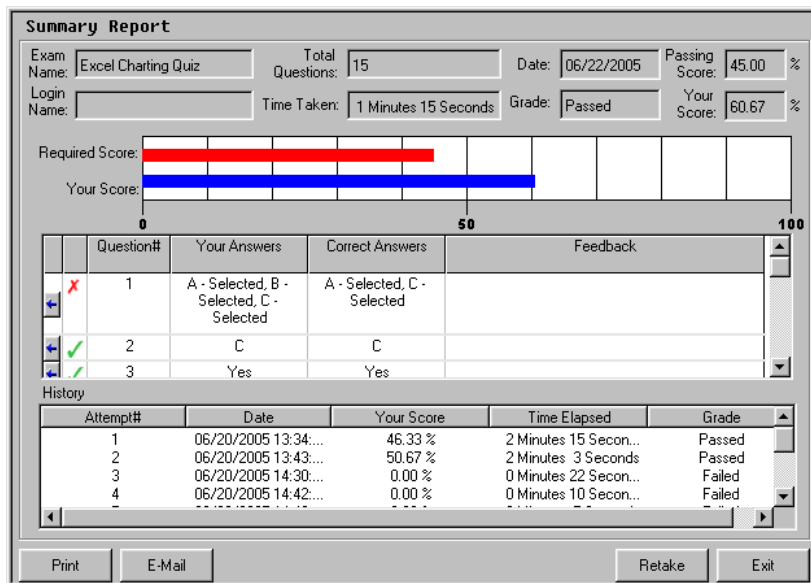
- **Question Overview** – This report provides the end user with information about the assessment in progress (including the number of questions answered and the number of questions attempted, the time elapsed and time remaining, the status of each question [Incomplete, Answered, or Flagged for Later Review], a link to each question in the assessment, a “Return” button that enables the user to return to the question they came from, and a “Submit” button to submit the finished assessment for scoring).



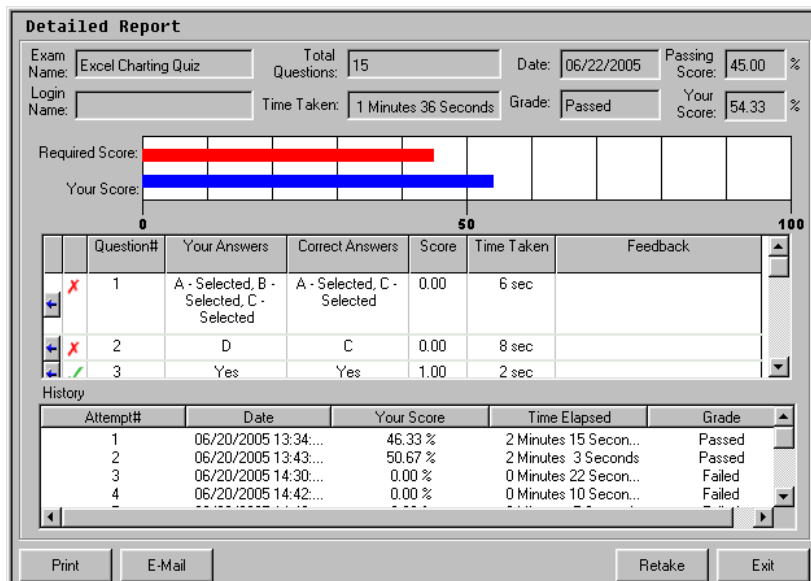
**Figure 2: Question Overview Report**

The developer can choose to display this overview report at the end of the assessment once all the questions have been answered, or a button can be provided on each question screen to allow the end user to view the overview report at any time during the assessment.

- **Summary or Detailed** – This report is displayed to the end user immediately after completing and submitting the assessment. It provides the user with immediate results, scoring, and item analysis data.



**Figure 3: Summary Report**



**Figure 4: Detailed Report**

The summary or detailed report may also optionally include a “Retake” button (for retaking the assessment), a “Print” button (for printing the report to paper) and an “E-mail” button (for e-mailing the assessment results/scores and analysis data to one or more recipients)

**NOTE:** In addition to RapidExam’s user-level exam reports, system administrators using the web-based **XStream LMS** may generate a large variety of administrator-level exam reports.

## Ending Frames

The developer may add **Ending Frames** to the exam. These frames represent the final end-of-exam screens that are displayed after the **Reports**. **Ending Frames** are ideal for displaying exam summaries, feedback, and follow-up information.

The developer has full control over the layout and look of each ending screen.

RapidExam also includes several features for enhancing the functionality of **Ending Frames**:

- **Conditional Display of Ending Frames** – For each **Ending Frame** created, the developer may specify that the screen will only be displayed to the end user when and if the end user meets a certain condition at runtime, such as passing the exam, failing the exam, or achieving a certain score within the exam. This enables the developer to provide different types of ending content/feedback that is context-specific and directly relates to the user's level of achievement within the exam. For example, if the end user fails the exam or achieves a low score in the exam, the screens displayed to the end user could provide links to courses or subject matter that needs to be reviewed, or suggest reference materials that should be accessed to obtain further information on the relevant topics. Conversely, if the end user passes the exam or achieves a high score within the exam, the screens displayed to the end user could provide exam achievement certificates or other positive feedback.
- **Print Capability for Ending Frames** – For each **Ending Frame** created, the developer can control whether the end user will be able to print the frame at runtime. Implementing printing capability on an Ending frame is useful for enabling users to print the information displayed on the frame (whether it be useful feedback information or an exam certificate that is displayed).

**NOTE:** The developer also has the capability of customizing the page margins for a printed Ending frame. The developer may specify the width (in inches) of the left, right, top, and bottom margins of the printed Ending frame.

- **E-mailing Capability for Ending Frames** – For each **Ending Frame** created, the developer can control whether the end user will be able to e-mail the frame to a chosen recipient at runtime. On any Ending frame, the developer may add a Hyperlink button and enable its "E-mail" property. When a user clicks the button at runtime, the user's e-mail software will be automatically launched, and a new message will be automatically created with the Ending frame included as a JPEG attachment.

Implementing e-mailing capability on an Ending frame is useful for enabling users to e-mail exam certificates (which may be conditionally displayed upon passing or failing the exam or achieving a certain score within the exam) to themselves or other users. In addition, a user could e-mail other types of useful feedback information that may be present on a particular Ending frame.

**NOTE:** E-mailing capability is not supported in exams saved in XML format or as XML-based SCORM courses.

## Exam Formats

Once the developer has created/edited the exam content, he/she may generate and save the exam frames as an online exam file. RapidExam enables the developer to save the exam in various formats:

- **EXM** – RapidExam's native exam file format. EXM files may be deployed to students over the **Web (Internet, Intranet, or Extranet)**, over a **Local Area Network (LAN)** or **Wide Area Network (WAN)**, and on **CD-ROM** using the RapidPlayer Runtime Player or ActiveX/Plug-in.

- **SWF** – Adobe Flash format. A Flash-based exam may be played over the web without loading a separate plug-in.
- **XML** – A standard, common, and consistent file format for sharing and accessing information over the Internet. An XML-based exam may be played over the web without loading a separate plug-in.
- **EXE** – A self-executing .EXE file. When this saving option is employed, the .EXM file is embedded with the RapidPlayer runtime player, thereby creating a self-executing .EXE application. The ability to create .EXE files simplifies exam distribution by eliminating the need to provide end users with the RapidPlayer application separately (since it is included within the .EXE file).
- **SCORM 2004, v1.2, or v1.1 Course** – A SCORM course package that may be administered and deployed through any Learning Management System (LMS) that supports the SCORM 2004, v1.2, or v1.1 standard. For more information, see **SCORM Compliance** later in this document.
- **Sharable Content Object (SCO)** – A self-contained, browser-launchable learning object that may be subsequently imported into a SCORM course in order to be scored/tracked as part of the course. For more information, see **SCORM Compliance** later in this document.
- **IMS QTI-Compliant File** – An IMS QTI-compliant XML file that may be imported and used within any third-party exam development tool that supports the IMS QTI specifications. For more information, see **IMS QTI Compliance** later in this document.

### **Printed (Paper-based) Exam**

In addition to saving the exam as an online .EXM, .SWF, .XML, .EXE, or SCORM-based file, RapidExam enables the developer to print the exam as a traditional paper-based exam, which may then be manually distributed to students.

The printed exam comes complete with title page and corresponding answer sheet. The developer determines how many questions to print and whether to print questions randomly or sequentially. The developer can also print the same exam for every user or a different exam for each user (i.e., each exam will have a separate code that links to its own unique answer sheet). The developer also has the flexibility to determine the types of questions to include in a printed exam.

## **Unique Features of RapidExam**

The advanced features of RapidExam have been designed around three main concepts:

- **Power** – Developers can build professional-level exams with unprecedented levels of interactivity and multimedia. Exam content does not get any better.
- **Speed** – Exam development is ultra-fast. With no programming and easy-to-use design tools, a developer can build a complete exam in a matter of hours.
- **Simplicity** – RapidExam allows virtually anyone to become an expert exam developer. Because development involves nothing more complicated than clicking and typing, even a non-technical user can build a detailed exam like a pro.

Key features of RapidExam include the following:

## 100% Programming Free

With RapidExam, the entire exam is created with nothing more than drag-and-drop mouse actions and option properties. There is absolutely no programming or scripts involved.

## Powerful Compression

RapidExam maximizes the user's disk space by employing a powerful compression algorithm to optimize .EXM files and keep them at manageable sizes. Storage requirements for objects (e.g., buttons, draw shapes, status bars, etc.) are reduced by approximately 80%. Storage requirements for sound clips are reduced by 80-97%.

## Step-by-Step Authoring Wizard

The **RapidExam Authoring Wizard** facilitates step-by-step assembly of questions and other components/elements of an assessment. Using a simple series of screens, the intuitive wizard guides the developer through each of the steps involved in creating and/or modifying an interactive assessment. Thus the wizard can be used to streamline and simplify the development of new assessments and the editing/updating of existing assessments.

When creating an assessment, the developer has the flexibility to either use the automated wizard or manually perform the authoring using the traditional tools provided in RapidExam.

## SCORM Compliance

RapidExam is a SCORM-compliant technology that enables developers to save exams as SCORM-compliant content packages.

The **Sharable Content Object Reference Model (SCORM)**, published by the Advanced Distributed Learning (ADL) project, is a collection of standards and specifications (adapted from multiple sources) that are used to enable interoperability, accessibility and reusability of web-based learning content.

As a continually evolving standard, there have been several versions of SCORM. RapidExam supports **SCORM 2004** (the most current version of SCORM) as well as **SCORM v1.2** and **SCORM v1.1** (previous versions of SCORM that are still widely used). A learning content file that complies with the SCORM specifications can be easily deployed and managed using any Learning Management System (LMS) that supports SCORM (including XStream's own web-based XStream LMS). For the purposes of SCORM, an LMS is any system for managing and deploying e-learning content.

In RapidExam, an exam may be saved as either a SCORM-compliant course package (consisting of a course manifest file, a course metadata file, and a single **SCO**) or a standalone **SCO** (which may be subsequently used within any SCORM-compliant course).

**NOTE:** An exam may also be saved as a Flash or XML-based SCORM course or **SCO** (in which the .EXM file is converted into a SWF or XML-based **SCO**).

## **Launching SCORM-Compliant Courses**

A SCORM 2004, v1.2, or v1.1 course may be registered and deployed through any Learning Management System (LMS) that supports the equivalent SCORM standard.

A **SCO** within a SCORM-compliant content package (saved from an .EXM file in RapidExam) is a self-contained, browser-launchable file. RapidExam **SCOs** are always launched using a web browser (e.g., Internet Explorer or Netscape). In addition, in order to enable proper tracking by the LMS, the self-contained **SCO** within the content package is played individually (i.e., a **SCO** cannot be launched from another **SCO**). Note that the precise method used to access the **SCO** within the SCORM content package is dependent on the individual LMS.

**XStream LMS**, XStream's web-based Learning Management System, may be used to register, launch, and track any SCORM v1.2 course created with RapidExam, RapidBuilder, Performance Analyzer, RapidSVG, or another third-party SCORM course-building tool.

**NOTE:** XStream LMS only supports SCORM v1.2 courses. It does not support SCORM 2004 or v1.1 courses. The SCORM 2004 and v1.1 courses created with RapidExam must be managed and deployed using a third-party LMS that supports SCORM 2004 or v1.1.

## **IMS QTI Compliance**

RapidExam supports the **IMS Question & Test Interoperability (QTI)** specifications.

IMS QTI is an XML-based development standard that enables the reuse of exam files between Exam Development Systems that are IMS QTI compliant. Therefore, if a developer has used another Exam Development Tool/Product and built an IMS QTI-compliant file, they will be able to import that file into RapidExam and then further edit/enhance the imported questions using the features and capabilities provided within RapidExam. Similarly, a developer can build an exam/assessment using RapidExam and then export it to IMS QTI format, which will then enable the developer to import and use the exam/assessment in another IMS QTI-compliant exam development tool.

## **508 Compliance**

RapidExam is a 508-compliant software technology, meaning that it incorporates certain accessibility features required to make it readily accessible to all users, including users with disabilities.

**Section 508** of the **U.S Rehabilitation Act** requires that departments and agencies of the U.S government develop, procure, maintain, or use electronic and information technology that enables users with disabilities to access and use information/data in a way that is comparable to that of all other users. Accordingly, in order to comply with the technical requirements of **Section 508**, a particular software technology must enable users to customize display, keyboard, mouse, and sound settings to meet their individual needs.

The universal accessibility obtained through 508 compliancy is a significant advantage because it makes the technology more user friendly and enables more users within an organization to take advantage of the technology.

The 508-compliant technology of RapidExam supports the use of keyboard equivalents for all mouse actions. The various RapidExam objects, dialog boxes, buttons, pop-up menus, and other features may be accessed and manipulated using designated keyboard keys or key combinations (instead of using the "point and click" functionality of the mouse device). These keyboard equivalents provide an alternative for visually impaired users or physically disabled users who may not be able to utilize the mouse device.

The 508-compliant features in RapidExam include:

- Support for Windows Accessibility Options in RapidExam and RapidPlayer. If Windows Accessibility Options are installed on your system, you may customize various keyboard, sound, display, and mouse accessibility options (including the ability to control the mouse pointer using designated keys on your keyboard's numeric keypad).
- Keyboard controls for object creation and editing (e.g., moving or resizing objects) and for moving/resizing program windows.
- Keyboard controls for accessing and navigating through the **Properties** window in RapidExam.
- Tab Ordering for all RapidExam objects (except Draw objects) in RapidExam and RapidPlayer. Object tab ordering enables the user to apply focus to different objects on the screen (i.e., allow different objects to become selected/highlighted) by repeatedly pressing the TAB key.
- Tab Ordering for all dialog boxes in RapidExam and RapidPlayer. Tab ordering within a dialog box enables the user to navigate among and select the different buttons, check boxes, radio buttons, and other elements of the dialog box by pressing the TAB key. In addition, all dialog boxes are clearly labeled.
- Support for keyboard functionality in the **Sound Recorder** (including button selection).
- Support for keyboard functionality in the **Color Palette** (including color selection and the specifying of red, green, and blue values).
- Support for keyboard functionality in the **Navigation Bar** (including navigating and cutting/copying frames).
- Support for keyboard functionality in the **Template Bar** (including the ability to toggle between Standard and Custom tabs and the ability to navigate among the different categories on each tab).
- Keyboard support for the **Video Stage** and **Flash Stage** – During editing in RapidExam, the keyboard may be used to perform various viewing/editing functions (Previous Frame, Next Frame, Set IN Frame, Set OUT Frame, etc.) on the file loaded in the **Video Stage/Flash Stage**. During playback in RapidPlayer, the keyboard may be used to access the playback controls (i.e., Play, Pause, Stop, Rewind, and Forward).
- Various RapidPlayer keyboard controls, including keyboard controls for tabbing between objects, and keyboard controls for adjusting/controlling volume during playback of files with audio components.

## Bookmarking Capability

RapidExam provides bookmarking capability.

This enables the end user to save his/her current location within the exam (thus saving all of the questions answered thus far during the exam session). During the process of taking an exam, if the end user needs to exit the exam (for whatever reason), the end user may later resume the exam on the very same question he/she was working on before the exam was exited.

The developer may specify that the exam file will contain No Bookmarking, Automatic Bookmarking (meaning the system will automatically save bookmarking information periodically during the exam), Manual Bookmarking (meaning the user will be prompted to save the exam when exiting), or a combination of Automatic and Manual Bookmarking (where the data is saved periodically and the user is also asked to save upon exiting).

## Spell Checker

RapidExam includes a **Spell Checker**, which enables the developer to detect and correct spelling errors in the text of various objects in the file.

## Import/Export Text

Because developers may need to create exams for non-English speaking users, RapidExam provides language customization capability.

RapidExam includes an **Import/Export Text** feature, which is used to export the text from selected frames/objects in the current RapidExam file to an XML file for the purpose of language translation. The translated text may later be imported from the XML file back into the RapidExam file in order to replace the original text.

### Exporting Text

The developer may select **File | Export Text** to open the **Export Text** dialog box, which contains a tree structure displaying all of the file's existing objects with properties/items that contain variable (changeable) text. The developer may select or deselect any of the objects (and their relevant properties) in this list, and then click the **Export** button to start the text-exporting process. An XML file will be created, and the text information from the selected file, frames, and objects will be exported to the XML file as XML tags.

Translation of the relevant text strings within the saved .XML file may be performed using any text editor.

### Importing Text

The developer may select **File | Import Text** to open the **Import Text** dialog box, which enables the developer to select the appropriate XML file (containing translated text). The developer then clicks the **Open** button to start importing the translated text contained in the various XML tags back to the appropriate frames/objects within the RapidExam file.

## Playback Language Selector

In addition to authoring exam content in a language other than English, developers require the capability of translating RapidExam's built-in playback text strings (i.e., the information/error messages, pop-up tool tips, and other built-in text strings that appear during exam playback) from the default English language into other languages.

To accommodate the need for different languages, RapidExam includes a **Playback Language Selector** feature, which enables developers to translate RapidExam's default English-language text strings into any desired language.

Using the **Playback Language Selector**, the developer may edit the default RapidExam text/message strings and translate them into any desired language. The translated strings are then saved to a language (.XML) file, which may be imported into RapidExam and applied to any .EXM exam file. During playback of the exam file, the selected, translated text strings (which were applied from the language file and stored in the exam file) are displayed as appropriate.

**NOTE:** External language (.XML) files created by other RapidExam developers may be imported for use on your own exam files. Likewise, you may export your language files to other folder locations in order to share the files with other RapidExam developers.

## Advanced Edit Objects

RapidExam's **Edit Palette** features an extensive set of edit objects that are used to create and enhance exam content. It contains the following objects:

- **Video Stage** – This is a scaleable window through which the developer can import and play .AVI, .MOV, .MPG and .ASF video files. The developer may add the **Video Stage** object to any exam screen and then use it to import and play linked or embedded video files within the exam. Video files can be played in both RapidExam and RapidPlayer.
- **Flash Stage** – This is a scaleable window that plays Flash (.SWF) files. The developer may add the **Flash Stage** object to any exam screen and then use it to import and play linked or embedded Flash files within the exam. Flash files can be played in both RapidExam and RapidPlayer.
- **Hyperlink** – This object enables the developer to add different types of interactive links to the exam. **Hyperlinks** can be configured to serve as links between exam frames in order to facilitate frame navigation. Each screen may contain multiple **Hyperlink** buttons, and each **Hyperlink** can have either a text label or a graphical image displayed on it. The presence of multiple **Hyperlink** buttons on a screen enables the user to not only navigate between screens but also perform other functions within an exam. **Hyperlinks** may serve as exhibit buttons for displaying pop-up text/images and running sound/video. They may also be configured as links to external RapidBuilder and Performance Analyzer files, executable files (.EXE, .BAT, .COM files), and Web pages.
- **Mouse Plot** – This object allows the developer to plot mouse positions on a frame in order to create mouse pointer animations. At runtime, a superimposed mouse pointer image will follow the path specified on the frame during editing. The developer may specify whether the mouse animation is initiated automatically when the frame is displayed on the screen or is initiated manually by the end user clicking the mouse, and the developer can also customize the **Mouse Plot** by importing any external cursor image to replace the standard mouse pointer image.
- **Fill-in-the-Blanks** – This object is used to add validation text fields to a **Question** frame in order to create a **Fill-in-the-Blanks** question. For each validation text field, the developer can specify the correct text string (including similar word forms, synonyms and homonyms) or numerical value, which will then be compared against the text entered by the end user at runtime.

The **Fill-in-the-Blanks** object supports **String-based Validation** (in which the end user can enter any text string), **Integer-based Validation** (in which the end user can enter only integer or non-decimal numeric values without any alphabetical or non-integer characters), and **Decimal-based Validation** (in which the end user can enter only decimal-based numeric values without any alphabetical or non-integer characters).

For **String-based Validation**, the **Fill-in-the-Blanks** object also supports a variety of wildcard characters, which may be used to substitute for one or more text characters within a validation string. This capability enables developers to create sophisticated validation strings and patterns with tremendous flexibility and power. For more information, see **Wildcard Characters in the Fill-in-the-Blanks Field** later in this document.

- **Short Answer Field** – This object is used to add short answer text fields to a **Question** frame in order to create a **Short Answer** question. The **Short Answer Field** object validates typed keyboard data by comparing user-inputted text with one or more keywords/associated words specified by the developer. The **Short Answer Field** object functions in a way that is similar to the **Fill-in-the-Blanks** object. The difference is that the **Fill-in-the-Blanks** object uses validation strings, while the **Short Answer Field** object uses keywords. In the case of a **Fill-in-the-Blanks** object, the end user's entered text will be compared against one or more strings of text specified by the developer. If the end user's text matches one of the specified strings, the answer will be validated as correct. In the case of a **Short Answer Field** object, the end user's entered text will be compared against one or more keywords specified by the developer. If the end user's text contains all of the specified keywords, the answer will be validated as correct.
- **Instruction Box** and **Text Field** – These objects are both used to display text in an exam. The **Instruction Box** is a resizable window designed to display extraneous text that is not part of the frame content. The end user can drag the Instruction Box around the screen as well as close it. The **Text Field** allows the developer to add text directly to any exam frame.

Text may also be converted to **hotwords**, which are interactive links to pop-up text messages or external RapidBuilder (.RBX) files.

- **Image** – This object allows the developer to import .BMP, .GIF, and .JPG image files and display them on any exam frame.
- **Animated GIF** – This object allows the developer to import animated .GIF image files and display them on any exam frame. The developer may play an animated .GIF file during editing in RapidExam. Right-clicking the animated .GIF object displays a shortcut menu that includes **Play** and **Stop** controls. During playback in RapidPlayer, the animated .GIF file will play automatically as soon as it appears on screen.
- **Login Field** – This object allows the developer to add **Login Fields** to a **Login** frame in order to create a **Login Screen**. The **Login Fields** are used by the end user to enter a user name and password in order to log in to the exam.
- **Radio Button** – This object allows the developer to add **Radio Buttons** to **Question** frames. **Radio Buttons** are used to create **True or False**, **Multiple Choice**, and **Matrix** questions.
- **Check Box** – This object allows the developer to add **Check Boxes** to **Question** frames. **Check Boxes** are used to create **Check List** and **Matrix** questions.
- **Combo Box** – This object allows the developer to add Windows-style **Combo Boxes** to **Question** frames. **Combo Boxes** are used to create **Combo Box** questions.
- **Edit Combo Box** – This object allows the developer to add Windows-style **Edit Combo Boxes** to **Question** frames. **Edit Combo Boxes** are used to create **Edit Combo Box** questions.

- **List Box** – This object allows the developer to add Windows-style **List Boxes** to **Question** frames. **List Boxes** are used to create **List Box** questions.
- **Hot Pencil** and **Hot Rectangle** – These tools enable the developer to draw **Hot Spots** (i.e., active regions that can be clicked by the end user at runtime) on a **Question** frame in order to create a **Hot Spot** question. The **Hot Pencil** tool is used to draw **Hot Spots** in a free-hand style. The **Hot Rectangle** tool is used to draw rectangular **Hot Spots**.

**NOTE:** A hot spot object may be configured to serve as the Done Button object for the question (by setting the hot spot object's "**Act as Done Button**" property to "**Yes**"). In such a case, when the hot spot is clicked, it duplicates the functionality of the Done Button by validating/scoring the question. This capability is useful if the developer does not wish to have a visible Done Button present on the screen, but instead would like the user to be able to select and score/validate a hot spot just by clicking the hot spot itself.

Note that even with the "**Act as Done Button**" property enabled for the hot spot object, the Done Button object must still be present on the frame in order for the question to function. However, since the Done Button does not need to be clicked by the user, the developer may hide the Done Button object by setting its Height and Width dimensions to "0".

- **Flag Box** – This object is used to add a **Flag Box** to a **Question** frame. **Flag Box** objects (which are essentially special check boxes) may be added to all question screens or selected question screens so that the end user has a mechanism for "flagging" the questions during playback. At runtime, whenever the end user encounters a difficult question that he/she would rather skip and come back to later, he/she can flag the question by clicking its **Flag Box**. Flagged questions are listed in the **Question Overview** report. At any time, the end user can access the **Question Overview** report (via **Hyperlinks** added to the question screens) to see which questions have been flagged, and he/she can return to a flagged question at any time (in order to answer it).

Developers may also specify additional trigger events for **Flag Boxes**. In addition to flagging the current question for later review, the action of clicking a **Flag Box** may also initiate a designated event, such as navigating to another frame in the exam, launching an external file, displaying a pop-up text message or image, playing a sound or video file, etc.

- **Status Bar** – This object allows the developer to add a **Status Bar** to selected exam frames. The **Status Bar** displays various pieces of information to the end user taking the exam, and the developer may customize it by specifying which information fields it will display. The **Status Bar** may be located at the top or bottom of the exam runtime window, and it includes the following default information fields:
  - **Login Name** – The name of the end user currently logged in.
  - **Exam Name** – The name of the exam.
  - **Question No.** – The current question number and the total number of questions.
  - **Score** – The end user's current score.
  - **Timer** – The countdown clock that displays the amount of time remaining in the exam.

- **Go** – A navigation function that allows the end user to jump to a specified question by typing its number in the **Go** field and then pressing **<ENTER>**.

## Superior Draw Tools

RapidExam's **Draw Palette** features all the draw objects and tools needed to visually enhance exam frames with lines, shapes, colors and custom art. It contains the following objects:

- **Line** – **Line** objects can be used to connect text fields, point to frame features, create tables and diagrams, and more. A **Line** can be styled as an arrow, and its size, color and width can be adjusted. It can also be displayed in different styles, including Solid, Dash and Dot.
- **Round Rectangle, Rectangle, and Ellipse** – **Round Rectangle, Rectangle, and Ellipse** objects can be used to create tables or visually enhance a frame. The size, color, border style, and border width of these objects can be adjusted. They can also be set to Opaque or Transparent, and they can be filled with a solid color, diagonal lines, vertical lines, horizontal lines, and more.
- **Fill Color** – The **Fill Color** tool allows the developer to select any color from the **Color Bar** and use it to color draw objects or frames.
- **Color Selector** – The **Color Selector** tool allows the developer to select any color from an inserted bitmap and save it as a color in the **Color Bar**. This color can then be applied to any shape object.
- **Pencil** – The **Pencil** tool allows the developer to draw free-form lines on a frame. The color of the lines can be adjusted.
- **Air Brush** – The **Air Brush** tool allows the developer to draw free-form lines with an airbrush effect. The color of the spray can be adjusted, and different coverage levels can be selected.
- **Paint Brush** – The **Paint Brush** tool allows the developer to draw free-form brush strokes with different levels of thickness and different styles. The color of the strokes can be adjusted. Different brush shapes (rounded, squared, ribbon up, ribbon down) as well as different levels of stroke thickness can be selected.
- **Polyline** – The **Polyline** tool allows the developer to draw straight lines with angles. The color and thickness of the line can be adjusted.
- **Polygon** – The **Polygon** tool allows the developer to draw a polygon (any shape with 3 or more straight line segments). The fill color and line thickness can be adjusted.

## Global Objects

RapidExam enables developers to quickly reuse objects/elements across multiple frames by making them Global. Objects can be set to be Global across certain frames or all frames (on which the objects are supported) within the RapidExam file.

This capability makes it easy to have similar objects/elements appearing across multiple frames. It also makes it easy to update the object/element (since modifying a global object/element automatically updates it on every frame where it is used). This also helps keep the file size down because only one copy of a global object/element is stored internally.

## Large Color Bar

RapidExam's **Color Bar** features over 200 different colors, which can be used to set the fill color of draw objects or the background color of frames. The developer has access to a broad range of colors to help create visually appealing exams. RapidExam also allows the developer to save palette changes as custom color palettes, which are stored as .CLR files and available at any time.

## Interactive Done Buttons

RapidExam's **Done Palette** includes twelve (12) **Done Button** objects. For each of the twelve available question types, there is an associated **Done Button** object that the developer must add to make the question function. (For example, if the developer were creating a **True or False** question, he/she would draw a **True or False Done Button** on the frame.) It is through the **Done Button** that the developer provides answer validation for the question by specifying which of the answers on the frame are correct or incorrect.

The **Done Button** can be configured to validate the question immediately, providing pop-up text/images or sound/video that include hint messages, correct or incorrect messages, and general feedback information. The end user will have a set number of allowed attempts to answer the question. This style of **Done Button** is used to create questions with **Immediate Feedback**. It is ideal for short quizzes and skill-building exercises.

Alternatively, the **Done Button** can be configured so that all immediate feedback settings are disabled, and the end user has an unlimited number of allowed attempts to answer the question. This style of **Done Button** is used to create a certification-style exam similar to the industry standard. During a certification exam, the end user is given 40-90 questions with a fixed amount of time (usually 90 minutes). The end user is allowed to click **Next** and **Previous** to view his/her questions. The end user can make any number of attempts during the time allotted for the exam. To answer a question, the end user will click on an answer and then click the **Next** button to move to the next question.

## Part Marks

In RapidExam, the developer may implement part marks functionality on a question-by-question basis. For each question created, the developer may enable or disable the "**Allow Part Marks**" property of the Done Button.

If the "**Allow Part Marks**" property is enabled, it means that the user is able to achieve a partial score for the question by getting it partially correct. In a question that requires multiple answers (i.e., multiple check box or combo box selections, multiple text entries, multiple click actions, multiple matches, multiple drag-and-drop actions, etc.), the user may receive part marks by providing only some of the required answers.

### NOTES

- In the **Answer Properties** dialog for each question, the developer may specify the weight value (as a percentage of the total mark) for each correct answer. By default, each correct answer designated by the developer will automatically be assigned an equal percentage of the mark (with the percentages totaling 100). The developer may change the default percentage values assigned to each correct answer (although the total should still equal 100).
- For any question with the **Allow Part Marks** property enabled, the developer may determine whether the user will be immediately navigated to the next question if he/she gets the current question partially correct. During playback of the question, if the user selects/identifies one or more—but not all—of the

correct answers and then clicks the Done Button, the user will be automatically taken to the next question in the exam.

## Internal Variables

Internal variables are predefined system variables representing certain dynamic information contained within the exam environment. They provide access to various pieces of user and exam-related information, such as the user's login name, the system date and time, the exam name, the passing score, the score achieved by the user in the exam, the total allowed time, the total number of questions, and more.

Internal variables can be inserted within **Text Fields** and **Instruction Boxes** in order to dynamically display system information to the end user during playback. This capability enables the developer to personalize the exam and present useful information to the end user as the exam is progressing. It can also help the developer to customize the information that is displayed on any certificate or information-based **Ending** frames shown at the end of the exam.

## Wildcard Characters in the Fill-in-the-Blanks Field

Wildcard characters are used to substitute for one or more text characters within a validation string in a **Fill-in-the-Blanks** field. The “?” character is used to substitute for a single character, and the “\*” character is used to substitute for any text string of multiple characters.

**NOTE:** A wildcard character may be overridden so that it can be used as an explicit character within the text string. To override a wildcard character, the developer simply specifies a forward slash before the wildcard character (i.e., specify /\* or /?). Note that because the forward slash (/) plays a role in the **Fill-in-the-Blanks** object, two forward slashes (//) need to be specified in order to use the forward slash as an explicit character within a text string.

In RapidExam, the **Fill-in-the-Blanks** object supports the following additional wildcard characters:

- **#** – Any number from 0 to 9.
- **{ABC}** – This will match any character specified within the opening and closing braces.
- **+C** – This will match any number of occurrences of the character specified.
- **!** – Stands for NOT. This character can only be used within braces, and it must be the first character. When used, this character will match any character that does not include any character specified within braces. (See the last example below).

**NOTE:** When specifying a set or sequence of characters within braces, use the pattern **<first character>** followed by **<hyphen>** followed by **<last character>** (e.g., A-Z). The developer may also specify multiple character ranges within one set of braces.

The following are some examples (and results) of using the above patterns:

- **{ADPR}** – This will match any character "A", "D", "P" or "R".
- **{A-Z}** – This will match any character from "A" to "Z" inclusive.
- **{A-DR-V}** – This will match any character from "A" to "D" inclusive or "R" to "V" inclusive.

- **{TY}?+R** – This will match any string that starts with "T" or "Y", followed by any one character, followed by any number of R's.
- **+?{A-Z}** – This will match any string that ends in any letter.
- **{A-Z}+?{0-9}** – This will match any string that starts with any letter and ends with any number.
- **+{!A-Z}** – This will match any string that does not contain a letter.

### Wildcard Number Values

The developer may use numbers before certain wildcard characters or actual characters within a text string in order to specify that the end user must enter a designated number of explicit characters. The number values are enclosed with forward slashes in order to differentiate them from actual explicit number characters included as part of the validation string. Consider the following examples:

- **/6?/** – Means any six characters.
- **/3#/** – Means any three numbers from 0 to 9.
- **/4a/** – Means four "a" characters must be present (instead of having to type aaaa).
- **/0na/** – "0n" is a wildcard character meaning "0 to any number". In this case, it means any number of "a" characters (including none) may be present.
- **/na/** – "n" is a wildcard character meaning "1 to any number". In this case, it means at least one "a" character must be present.

### Space Validation

The "0n" and "n" wildcards may also be used to validate spaces within a validation string:

- To specify 0 or more spaces between words, the developer would use the tag **/0n /** (i.e., a forward slash, followed by the number 0, followed by the letter n, followed by a space, followed by another forward slash) within the validation string.
- To specify 1 or more spaces between words, the developer would use the tag **/n /** (i.e., a forward slash, followed by the letter n, followed by a space, followed by another forward slash) within the validation string.

The following is an example of space validation:

```
SELECT/n /FROM/n /Customers/n /Where/n /City/0n /=/0n /"San Francisco"
```

In this case, up until the word "City", the end user must enter words with 1 or more spaces in between. After the word "City", the end user can enter 0 or more spaces before or after the "=" sign.

### Partial Case Sensitivity

The developer may implement partial case sensitivity within a validation string (i.e., specify parts of the validation string as case sensitive rather than the entire thing being case sensitive).

To specify partial case sensitivity, the developer will use the tag **/cs/** or **/CS/** within the validation string. The developer may specify as many of these tags as required within the validation string. If there is an even number of tags, then only the characters between the tags are case sensitive. Everything outside of the tags will not be case sensitive. If there is an odd number of tags, then everything from the last **/cs/** tag to the end of the string will be case sensitive.

Consider the following examples:

- **Example #1** (Even # of tags): Rapid **/cs/**Exam **/cs/**Test

Meaning: (case insensitive)**/cs/**(case sensitive)**/cs/**(case insensitive)

End User Inputs: Rapid Exam Test – **Correct**

Rapid exam Test – **Incorrect**

RAPID Exam TEST – **Correct**

- **Example #2** (Odd # of tags): Rapid **/cs/**Exam **/cs/**Fill-in-the-Blanks **/cs/**Field Test

Meaning: (case insensitive)**/cs/**(case sensitive)**/cs/**(case insensitive)**/cs/**(case sensitive)

End User Inputs: Rapid Exam Fill-in-the-Blanks Field Test – **Correct**

RAPID Exam FILL-IN-THE-BLANKS Field Test – **Correct**

Rapid exam Fill-in-the-Blanks Field Test – **Incorrect**

Rapid Exam Fill-in-the-Blanks Field TEST – **Incorrect**

**NOTE:** If the “**Case Sensitive**” property within the **Fill-in-the-Blanks Properties** window is set to “**Yes**”, any **/cs/** tags within the validation string are ignored since the entire string is now case sensitive. To implement partial case sensitivity using **/cs/** tags, the “**Case Sensitive**” property must be set to “**No**”.

### Combining Multiple Wildcard Characters

Depending on the requirement of the strings that users will need to type during playback of an exam, the developer may need to create validation strings that combine multiple wildcard characters together. The capability of combining multiple wildcards can result in sophisticated and powerful **Fill-in-the-Blanks** objects incorporating complex validation patterns.

The following is an example of a validation string containing multiple wildcards:

**{A-Z}{1-9}{A-Z}/0n /{2468}{A-Z}{0-9}**

A	B	C			

- A. Specifies that the first three characters must consist of an alphabetic character, followed by a number from 1 to 9, followed by another alphabetic character.
- B. Specifies that zero or more spaces must be included before the next character is specified.
- C. Specifies that the first character must be one of the numbers 2, 4, 6 or 8, the second character must be an alphabetic character, and the third character must be any number from 0 to 9.

Example of correct end user input: **N3Y 6A7** or **N3Y6A7**

Example of incorrect end user input: **N3Y3A7** or **ABCDEF**

## Question and Certificate Templates

RapidExam provides a series of built-in question and certificate template frames.

The question templates can be imported to the **Input Questions** section of an exam for quick development of question content, and the certificate templates can be imported to the **Ending Frames** section of an exam to provide end users with exam achievement certificates at the end of the exam.

The certificates can be used in conjunction with the conditional display of **Ending Frames** so that the end user is only presented with a certificate at the end of the exam if the end user has met a certain condition, such as passing the exam. In addition, different certificates could be displayed based on the score or range of scores received within the exam.

Templates can also be created, edited and customized using RapidExam's **Template Editor**. In addition to the built-in question and certificate templates provided with RapidExam, developers may create and customize their own templates (including customized question templates, certificate templates, and other types of templates) within template (.TXM) files.

Developers can also save any frame from any RapidExam file as a template and then use it across many different files. Developers can create as many template files as they want (each containing a set of template frames) and then share them across multiple developers and multiple files. Templates allow for quick development of exam frames and also allow for consistency across multiple RapidExam files that are created.

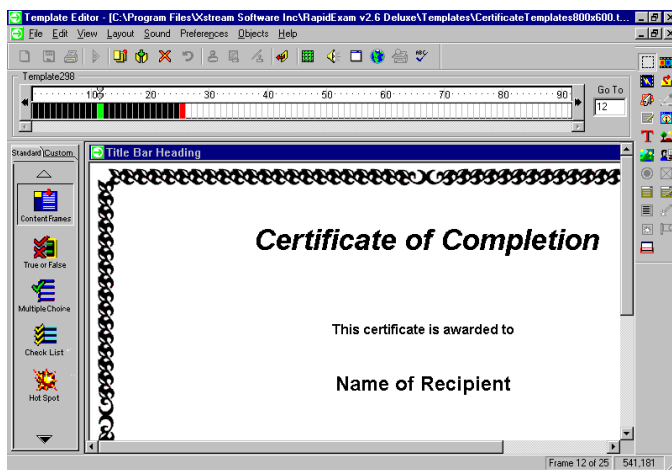


Figure 5: Template Editor

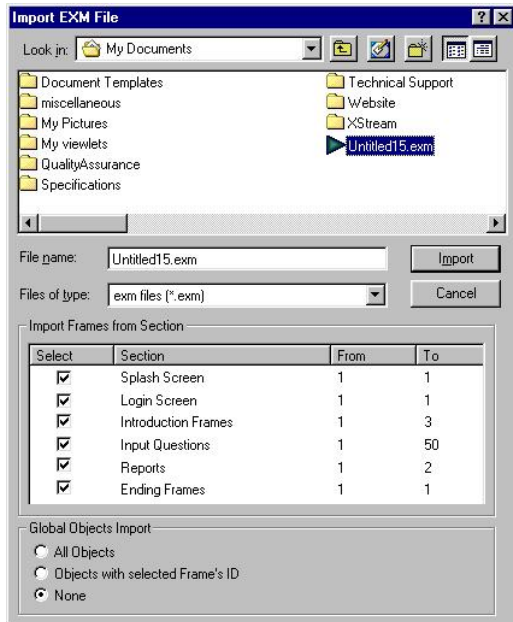
**NOTE:** When importing a template frame from a template (.TXM) file to the current .EXM file, the developer has the option of also importing the customized Global Properties from the .TXM file and applying them to the .EXM file.

Through the **Import Template** dialog box, the developer selects the template frame to be imported (from the .TXM file). Before clicking the **Import** button to import the template frame to the .EXM file, the developer may also select the “**Import Global Properties from the template file**” check box. With this option enabled, the Global Properties that have been set for the template (.TXM) file will be imported to the .EXM file along with the template frame. The imported Global Properties will be automatically applied to the .EXM file (as shown in the **Global Properties** window).

## Importing Exam Frames

RapidExam provides the capability of importing multiple frames (screens) from other RapidExam (.EXM) files into the currently open .EXM file. This allows developers to easily reuse portions of existing exam files.

To import external exam frames into the current RapidExam file, the developer selects **File | Import File | EXM** on the **Menu Bar** to display the **Import EXM File** dialog box.



**Figure 6: Import EXM File Dialog Box**

After selecting an .EXM file, the developer may specify frame ranges to be imported from each individual section of the selected exam (Splash Screen, Login Screen, Introduction Frames, Input Questions, Reports, and Ending Frames).

Once the developer clicks the **Import** button, the selected frames will be imported into the corresponding sections of the current RapidExam file.

**NOTE:** In the case of frames imported from the Reports section, only the frame property values will be imported (rather than the frame itself). This is because additional report frames cannot be added to an exam.

## Assigning Question Difficulty Levels

The developer may guarantee a consistent level of difficulty in an exam by assigning an estimated level of difficulty between 1 and 10 to each exam question. The developer may then specify the percentage of questions from each difficulty category that will be included in a single exam session.

## Set Time Limits for Exams

When an exam created with RapidExam is run, a built-in timer automatically measures the duration of the exam in minutes. The developer can specify the maximum number of minutes the end user has to complete the exam as well as the number of minutes the end user may spend on a single question. In addition, the developer can specify whether or not the exam ends when the time has elapsed. A countdown clock is displayed on the **Status Bar** so that the end user is always aware of how much time remains.

## Questions Displayed Randomly or Sequentially at Runtime

RapidExam allows the developer to choose whether exam questions are displayed at random or in sequence during playback:

- **Random** – Each question is randomly selected from the pool of available questions. A questioning history is maintained between exam sessions so that the end user is guaranteed not to experience any duplicate questions within a single session.
- **Sequential** – Questions are displayed in numerical order.

**NOTE:** If the questions are displayed sequentially, the developer may further define if each exam session will always consist of the same set of sequential questions beginning with the first question in the pool of questions (e.g., if 10 questions from a question pool of 50 are set to be displayed for a single session, questions #1 to #10 will always be displayed in each session) or if each exam session will consist of a different set of sequential questions from the pool of questions (e.g., if 10 questions from a question pool of 50 are set to be displayed for a single session, questions #1 to #10 will be displayed in the first session, questions #11 to #20 will be displayed in the second session, questions #21 to #30 will be displayed in the third session, etc.).

## Question Sequence Definition

RapidExam provides developers with the option of defining custom exam sets and question sequences for the current exam. This option will override the standard sequential and random question delivery in favor of custom question delivery.

Through the **Customize Sequence** dialog box (accessed through the **Global Properties** window), the developer may customize any number of unique exam sets (sessions) for the current exam file. The developer may specify the order in which the exam sets will be played, and the developer may also customize each selected exam set by performing the following tasks:

- **Adding/removing questions from the exam set** – The developer may customize the content of the exam set by selecting which questions will be included in the set. All of the questions present in the exam file are listed, and the developer may add any question to the set as well as remove any question from the set.

**NOTE:** While adding/removing questions from an exam set, the developer may preview any selected question by clicking the **Preview** button provided. This action will display the question frame in a separate pop-up window.

- **Defining the question sequence for the exam set** – The developer may also specify the exact order/sequence in which the questions within the set will be displayed to the end user.

**NOTE:** Once all of the defined sets for the exam have been played, the playback cycle will begin again (starting with the first exam set defined in the list).

## Feedback and Hints

In RapidExam, several types of feedback may be created:

- **Immediate Feedback** – For each type of question, feedback messages may be created to provide immediate question-level feedback for correct and/or incorrect answers to questions. The feedback may be in the form of text (displayed in a pop-up window or in a Text Field on the screen), images, or audio.
- **Partially Correct Feedback** – For each type of question (except the True or False and Multiple Choice question types), the developer may specify partially correct feedback, which will be displayed in the event that the user gets the question partially correct (i.e., the user provides some—but not all—of the required correct answers). Again, the partially correct feedback may be in the form of text (displayed in a pop-up window or in a Text Field on the screen), images, or audio.
- **Hints** – Hint messages may also be created to provide the end user with hints/tips as he/she is working on a question. The developer may add Hyperlink buttons that link to hint messages/images or sound/video. The developer may also configure hints to be displayed after a certain number of attempts on a question. Once again, these hints can be messages, images, sound files or video files. The hint messages can be displayed either as a pop-up message or in a text field that exists on the screen.
- **Report Feedback** – For each type of question, the developer may define report feedback text, which will be displayed in the Feedback column of the Summary/Detailed report once the end user has submitted the exam.

**NOTE:** When defining the report feedback text for a question, the developer may define the specific conditions under which the question feedback text will be displayed in the Summary/Detailed report (i.e., the question feedback text may always be displayed regardless of the question outcome or only displayed if the end user got the question completely correct, completely incorrect, partially correct, or either incorrect or partially correct). In addition, the developer may create different messages that will be displayed in the report depending on whether the user got the question completely correct, partially correct, or incorrect. Therefore, for each question, the Summary/Detailed report can display custom feedback that is specific to the actual result achieved by the user.

## Audio/Sound Support

RapidExam supports several methods of adding audio/sound to exams:

- **Sound Files Linked to Frames and Buttons** – An external sound file (.ASF, .MP2, .MP3, .WAV, .RA, .AVI, .MID) can be attached to any specific frame of the exam. The sound will automatically play when the frame appears on screen at runtime. A sound file can also be played with a Hyperlink button. On a single frame, there can be multiple Hyperlink buttons linked to different sound files.
- **Recorded Sound Clip** – RapidExam's built-in **Sound Recorder** can record voice-overs and other sound clips from any sound device present on the developer's system (e.g., microphone, CD player, etc.) A sound clip can be recorded on any exam frame, where it will play automatically at runtime. Recorded sound clips are stored within the exam (.EXM file).
- **Background Sound** – RapidExam allows the developer to specify an external sound file as sound that will play in the background throughout the duration of the exam.

## Results Viewer

RapidExam ships with an easy-to-use **Results Viewer** application, which is used to view the results/scoring data within result (RSL) files.

During playback of an exam, an RSL file is automatically generated and its scoring/analysis data is displayed to the student as an online report at the end of the exam. Using the Results Viewer, a user can also independently access any RSL file (containing a student's scoring, analysis, and session data for a given exam) and generate it as an HTML-based report. Each report can be viewed in a browser and saved/archived to disk.

Therefore, in addition to reports being viewed online by students during exam playback and by authorized administrators generating reports in an LMS environment, the Results Viewer enables RSL files to be independently mined and viewed offline, providing teachers and managers with on-demand capability for instantly accessing and managing student results.

## Deploying and Managing Exams

### Deploying Exam Files

RapidExam (EXM/SWF/XML) files may be deployed to students on **CD-ROM**, over a **Local Area Network (LAN)** or **Wide Area Network (WAN)**, and over the **Web (Internet, Intranet, or Extranet)**. Automatic streaming capabilities enable RapidExam files to play smoothly even across slow Internet connections.

Deployment of .EXM files is accomplished with the following tools:

- **RapidPlayer Runtime** – XStream's universal runtime player, which is provided with RapidExam.



**Figure 7: RapidPlayer Runtime**

**RapidPlayer Runtime** is used to play RapidExam exam (.EXM) files as well as offline exam (.EXO) files, RapidBuilder (.RBX/.RPR) files, and Performance Analyzer (.RPE) files. RapidPlayer Runtime is designed to stream files over the Internet just as easily as it does on a local hard drive or LAN/WAN drive.

RapidPlayer's streaming technology starts and ends on the client's machine and requires no additional software on the server side. Streaming is accomplished by buffering frames in the background and displaying them as needed. EXM, .EXO, .RBX, .RPR, and .RPE files are optimized for low-bandwidth environments, such as dial-up, modem-based connections.

- **RapidPlayer ActiveX Control for Internet Explorer** – XStream's ActiveX Control streams and plays .EXM, .RBX, .RPR, and .RPE files over the Internet through the Internet Explorer browser. It is available from XStream's download page at <http://www.xstreamsoftware.com/downloads.htm>.
- **RapidPlayer Plug-in for Netscape** – XStream's plug-in for Netscape streams and plays .EXM, .RBX, .RPR, and .RPE files over the Internet through the Netscape browser. It is available from XStream's download page at <http://www.xstreamsoftware.com/downloads.htm>.

Flash and XML files may be played over the Web without loading a separate plug-in. Internet Explorer 5.0 or higher is required for playing XML files.

## **Managing Exam Files with XStream LMS**

RapidExam files may be either distributed as standalone files or uploaded to the web-based **XStream LMS** (or any third-party SCORM-compliant LMS).

XStream LMS is a comprehensive, web-based LMS, which includes full capabilities for managing, scheduling, tracking/scoring, and reporting on all types of online learning content (including courses, assessments, SCORM-compliant content, and more) as well as offline classrooms/events. Other capabilities include extensive reporting capabilities, self-registration capabilities, learning paths, prerequisite definitions, bookmarking capabilities, offline exam generation, and more.

## **Who Benefits from RapidExam?**

RapidExam is the ideal authoring solution for anyone with a need to develop and deploy online, multimedia exams in the quickest, simplest and most cost-effective way possible. The following are a few examples:

### **CBT/Courseware Developers**

Use RapidExam to supplement your core material with interactive review exams. Make your products more relevant and appealing to students by incorporating high-quality exams with integrated audio, video and graphics. Because there is no need for a traditional development team of graphic artists, multimedia programmers and audio/visual experts, exam development is both quick and inexpensive.

### **Trainers**

Whether you are providing internal training for employees or external training for clients, RapidExam is perfect for developing custom exams to reinforce your training content. Working quickly and easily, you can build exams on demand and tailor the content to meet the needs of specific end users. As your training material is updated and changed, it's easy to edit and modify existing exams to reflect the changes. Exams can also be deployed to end users over an Intranet or the Internet, making them ideal for Web-based E-Learning.

### **Educational Institutions**

Use RapidExam to develop modern, computer-based exams for any course or subject. Without a great deal of time or cost, you can replace conventional written tests with interactive, multimedia exams. Working with exam content that is extremely visual and hands-on, students are more likely to stay focused and engaged. Exam content can be expanded beyond questions by including graphics, sound, video and even links to external simulations and Web pages. Exams can also be easily modified and updated at any time. Exams developed with RapidExam also save time by generating students' scores automatically, eliminating the need to grade exams manually.

## Contact Information

For more information on **RapidExam v3.0 Deluxe**, please contact our sales team either by phone at (613) 731-9443 or by e-mail at [salesupport@xstreamsoftware.com](mailto:salesupport@xstreamsoftware.com).

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