

RESEARCH OF CROSS-PLATFORM MODULAR EDUCATIONAL APPLICATIONS DEVELOPED ON ECLIPSE IDE

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Abstract. This article explores the Eclipse IDE platform for developing a cross-platform mobile educational application. The article discusses that to create a mobile application, a developer needs to go through several stages: development, testing and commissioning of a mobile application. Since each of these stages is a rather lengthy and complex process, it is proposed to consider these stages in more detail within the framework of this work. The research methods analyze the advantages and disadvantages of the platform. The structure and creation of a project using Eclipse IDE is explored. As a result, when the application is launched, additional functions such as plugins are described. In conclusion, special attention is paid to the fact that the created application is educational. Since in times of modern electronic technologies, distance learning is gaining increasing popularity among educational institutions. The development of information technology and the global pandemic have created a demand for distance learning. As a tool for improving the quality of education on a mass scale, teachers are pinning their hopes on computer technology. Distance learning systems use all types of information technologies, but new information technologies are most often used: computers, mobile devices, computer networks, multimedia systems, etc. The relevance of the topic is that it was at this time that mobile devices gained great popularity and use, which made people's lives much easier. The purpose of the study is to study the capabilities, advantages and disadvantages of the cross-platform modular platform Eclipse IDE for developing educational applications.

Key words: mobile application; platform; virtual machine; technology; graphical elements; program interface.

INTRODUCTION

Eclipse is a Java development environment developed and maintained by the Eclipse Foundation (which includes companies that offer products based on IBM, SAP, Oracle, Eclipse RCP and participate in the development of Google, RedHat, Adobe, Cisco, and Intel ecosystems). Eclipse RCP is a set of plugins for creating a rich client application. When you open the Eclipse IDE, the user sees a plugin built into the framework. The user can create their own plugins based on already existing plugins, and if necessary, you can already find most of the popular frameworks, such as Hibernate, Google Guice, Google Guava, JUnit, TestNG, as plugins [1].

RESEARCH METHODS

Advantages and disadvantages of the platform. The main question is why this platform is so well used and why you should use it to develop desktop applications. Modular, cross-platform, multilingual support, free, many existing plugins, libraries and frameworks. All this makes it possible to create commercial-level applications (at the end of the article there is a link to the list of existing applications created on this platform). Disadvantages include a fairly high level of entry, because in order to develop a serious application, you need to know how the OSGI framework works in general and be able to work with SWT and JFace components and widgets.

To work, we need to download the package: Eclipse for RCP and RAP developers from the official site. If the Eclipse IDE is installed, you can use the update manager. Open the General Purpose Tools section and select the Eclipse Plug-in Development Environment, then open the EclipseRT target platform, select the Components item and select the plugin - Eclipse RCP Plug-in Developer

Resources, these are the two plugins we need to build our project. Next, click Next twice, accept the license agreement, and click Finish; with this, the installation of the required plugins will begin. After installation, we will prompt you to restart Eclipse to build it [2].

CREATING A PROJECT

After rebooting, select File → New → Other from the main menu, select Plug-in Development, and then select Plug-in Project from the drop-down menu (fig. 1).

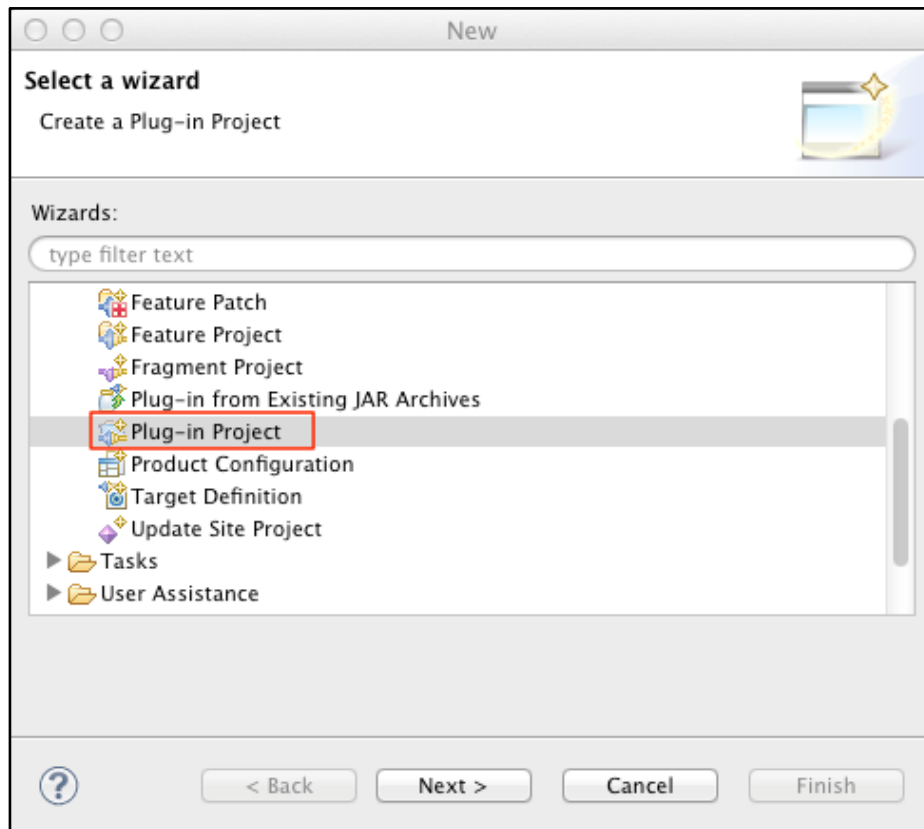


Fig. 1 Menu for selecting the type of project to create.

PROJECT STRUCTURE

The contents of the five classes in the First.rcp.application package are not of interest to us at this time, except that the MyApplication class is somehow the main() method of a regular Java program, this class is responsible for how our plugin is started and how it is stopped ... in the ApplicationWorkbenchWindowAdvisor class we can set the size of the application window with the following line of code [3]:

```
configurer.setInitialSize(new Point(400, 300));
```

We can also see that the toolbar and status bar are not displayed by default:

```
configurer.setShowCoolBar(false);
```

```
configurer.setShowStatusLine(false);
```

The last line sets the title of the main window:

```
configurer.setTitle("User Form");
```

RESULT

Starting a project. To run the application we just created, we need to go to the META-INF folder and open the MANIFEST.MF file if you suddenly close it (this file is opened by default when the project is created).

This file allows you to change many project settings, add additional plugins, add and manage extensions, customize the build of our plugin, and more. We are in the "Review" tab, if we click on the link in the "Testing" section – the Eclipse application will be launched, after a while the application window will appear on the screen, close it and proceed to the next stage [4–6].

Add an extension. Our task is to create a view that can contain GUI elements. MANIFEST.Go back to the MF file and select the Extensions tab at the bottom. By default, we see that we have two extensions: org.eclipse.core.runtime.applications and org.eclipse.ui.perspectives. The first extension is associated with the application class MyApplication.If we select this extension and create the tree view first.rcp.application. If we extend MyApplication (run) to a node, we can see that the class field has this particular AT [7, 8].

The second extension is responsible for defining the perspective of our application. MANIFEST. The MF file allows us to determine which views and / or editors a given perspective consists of, their location, size, and ratio, without looking at the code of the perspective class. By clicking this extension and navigating to the child branch, we can see that we can specify the perspective class, ID, and name in the extension element details section [4]. Changes like the one mentioned above include direct editing of the class code associated with this extension and the plugin.it should be noted that the xml file can be created by editing (fig. 2).

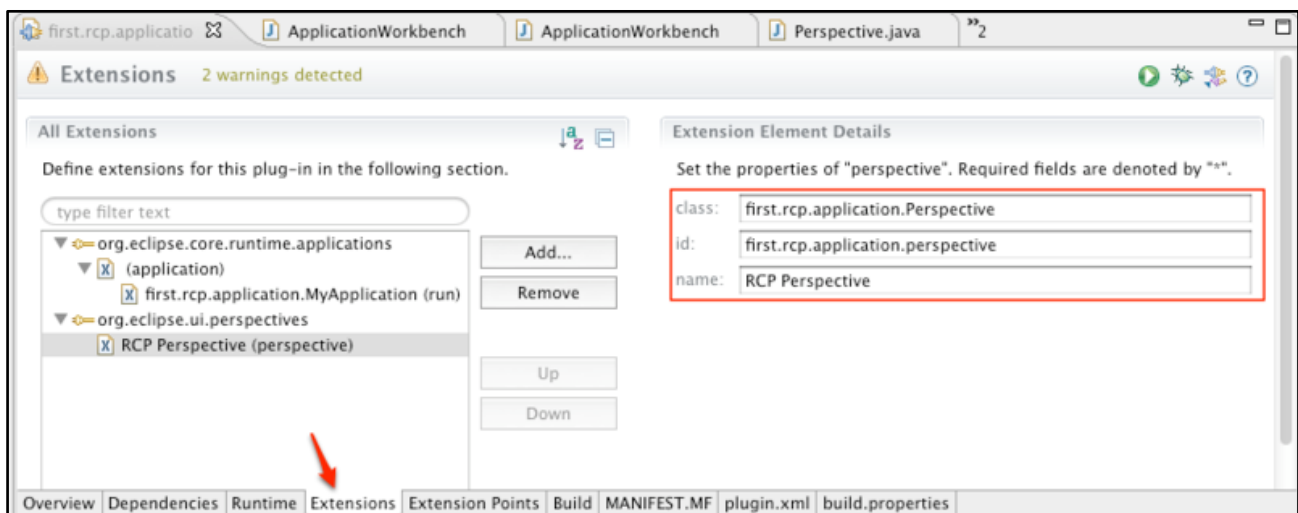


Fig. 2 Extensions.

We can do manipulations whenever we want in the extension editor, or we can open the code of the perspective class we will create – Perspective.java. Let's go to the createInitialLayout() method in the perspective class, this method sets the initial position of views and editors. Write the following two lines of code in the method:

```
layout.setEditorAreaVisible(false);
layout.addStandaloneView(MainView.ID, true, IPageLayout.LEFT, 1.0f, layout.getEditorArea());
```

The first line tells the layout object that it doesn't need an edit area, because we only have one view, and editors don't. The second line makes our view more self-contained. The first parameter is the ID of our view. The second parameter is a Boolean value, which is responsible for the fact that

the header of our view (form n)it is displayed and what is not. The third parameter is intended to indicate the orientation of the perspective view, since we have only one view and it occupies the entire perspective space, this value can be any. The fourth parameter determines the position of this view in relation to other views or editors, since in our case one view should occupy the entire perspective space. The last fifth parameter is the ID of the editor area. Save our changes.

So, this additional window will appear at the end (fig. 3).

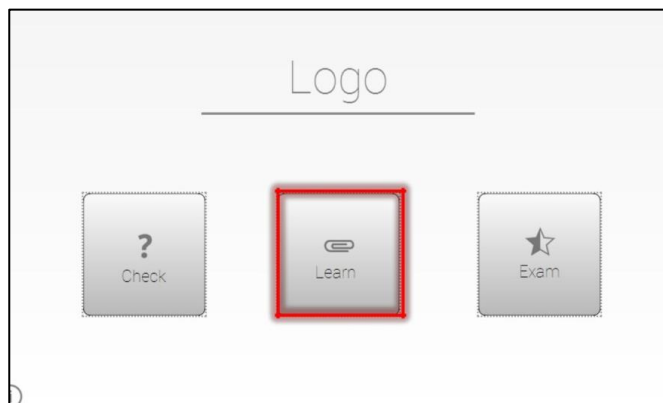


Fig. 3 Application window.

CONCLUSION

It is known that modern mobile technologies are rapidly entering various spheres of human life, and the use of mobile applications is quite effective. Including educational applications [9–20]. They are very convenient to receive, memorize, read information and are always at hand, that is, the user can start it anytime and anywhere (if there is an Internet connection). It doesn't take as much time as downloading a program or website on your computer. In general, mobile applications are currently the most used and relevant.

As a result of the study, the application was implemented in the Java Eclipse IDE platform.

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МЕТАДАННЫЕ / METADATA

Заглавие: Исследование кроссплатформенных модульных образовательных приложений, разработанных на Eclipse IDE.

Аннотация: В данной статье исследуется платформа Eclipse IDE для разработки мобильного кроссплатформенного образовательного приложения. В статье рассмотрено, что для создания мобильного приложения разработчику необходимо пройти через несколько этапов: разработка, тестирование и ввод в эксплуатацию мобильного приложения. В связи с тем что каждый из этих этапов представляет собой довольно продолжительный и сложный процесс, предлагается рассмотреть данные этапы в рамках данной работы более подробно. В методах исследования проводится анализ преимуществ и недостатков платформы. Исследуются структура и создание проекта на Eclipse IDE. В результате чего, при запуске приложения описываются такие дополнительные функции, как плагины. В заключение особое внимание уделено тому, что созданное приложение является образовательным, так как во времена современных электронных технологий дистанционное обучение набирает все большую популярность среди учебных заведений. Развитие информационных технологий и всемирная пандемия вызвали спрос на дистанционное обучение. В качестве инструмента повышения качества обучения в массовых масштабах педагоги возлагают надежды на компьютерные технологии. В системах дистанционного обучения используются все виды информационных технологий, но наиболее часто – новые информационные технологии: компьютеры, мобильные устройства, компьютерные сети, мультимедийные системы и др. Актуальность темы в том, что именно в это время мобильные устройства приобрели большую популярность и применение, что значительно облегчило жизнь людей. Цель исследования – изучить возможности, преимущества и недостатки кроссплатформенной модульной платформы Eclipse IDE для разработки образовательных приложений.

Key words: мобильное приложение; платформа; виртуальная машина; технология; графические элементы; интерфейс программы.

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