

STUDIJNÍ PRÁCE

Opponent's Expertise for Bachelor's Thesis:
Rozhraní pro tvorbu plošinových her

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Summary

This bachelor's thesis provides a framework for simple jump-and-run games such as Mario or Braid. The framework consists of a game engine and an editor, and is based on the event-driven programming paradigm. This means that the flow of the program is event-based and these events are managed and passed to the corresponding handler. The handler in turn processes this event and signals when it is done. The game engine is written in C++ and provides the possibility to load and play game levels. To render the scene, the Ogre library is used. The editor is written in C# and uses the game engine in order to directly test and design levels. It offers functionality such as the placement of objects and the AI path planning of game units. In order to use the game engine in the game editor, a middle layer was developed using the C++/CLI language, which is a part of the .NET framework. The C++/CLI language allows to mix C++ and C++/CLI code. The result is compiled as a dynamic link library (.dll) which may then be used in C#. The game logics are implemented with the scripting language LUA, e.g. all the game logic, AI, cutscenes, and game objects are saved and manipulated as scripts. Each level has his own script which is executed when the game runs. During the game, level objects, for example, are added with the help of LUA scripts. Furthermore, the 'Bullet' library is used for the physics simulations in the game, such as collision detection or gravity and each level object is a physics object. Model objects can have an animation script attached to it, this is required for objects that move around, such as the player or the enemies. After the introductory chapter and an overview on the different game genres, the thesis provides some details about existing technologies, such as game engines and physics engines, editors, and scripting languages. The choices made for the thesis are explained. Then follows a chapter, where the framework is designed, the level structure is explained, and the event-based handling is justified. The classic game loop which consists of three main tasks called 'process user input', 'update', and 'render scene' is transformed into a 'distribute and handle events' phase because of the event-driven engine. Finally, some implementation details are provided in the last chapter, including exception handling, thread safety, and the game engine, for example.

Grading

Contribution & Performance

The contribution of the thesis is very satisfying. The programming is very clean and the number of features provided in Mr. Mačalík's work is remarkable. Furthermore, the number of technologies and programming languages used is very impressive. Finally, all the goals of the thesis were fulfilled. The grade for this part is an A - excellent.

Document Layout

The document is well structured but there are a few minor errors. The font used for the text on page 27 looks different compared to the remaining text in the thesis. On Page 33, section 5.6 the word "rozhraní" is printed twice in a row. There is a missing white space on page 61 after the word \LaTeX or, on page 35, the word "(RD:AgentGoal)" is not correctly justified. Furthermore, there are some spelling mistakes such as on page 38, section 5.9, where "Lažďy" is written instead of "Každý". Finally, in order to highlight words referring to program components such as classes or functions a different font should have been used. This would have improved the readability of the documentation. Therefore, this part is graded with a B - very good.

Media & Sources

Unfortunately, precompiled applications cannot be started because the dynamic link library "d3dx9_42.dll" is missing. Furthermore, the code is only sparsely commented. Besides that the code is clean and readable. The grade for this part is a B - very good.

Language & Content

The bachelor's thesis is written in Czech. The English abstract contains some errors, such as wrongly spelled words ("aknowledges" instead of "acknowledges"), missing prepositions ("a" and "the") and words which should have been written with small starting letters ("Design and Implementation" instead of "design and implementation"). The movement description of units in 2D strategic games on page 36 is very simplified from my point of view. On page 12 the game "Half-Life" is mentioned instead of "Half-Life 2", which is correct according to

the mentioned year of release. More diagrams could have been used, on page 39, section 5.9.2, for example, adding a diagram or image could have illustrated, what exactly is written in the text. As a result, the grade for this part is a B - very good.

Conclusion

Although there are minor drawbacks such as the missing .dll file and the layout or language errors, the contribution is great and the implementations is fine. Furthermore, there is potential for future work and Mr. Mačalík has well proven during the creation of this thesis that he can work with numerous technologies and successfully combine them into one larger project. I recommend the thesis to be defended and as a final grade I clearly suggest an A - excellent.

L. Novosad

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