

GUI Project

Write an application that implements a game in the style of “Pacman”. Make the project using Swing.

An example of the game: <http://pj.edu.pl/pacman>

In the game, every 5 seconds, enemies have a 25% chance to create upgrades (e.g. +50% movement speed, etc.) that the player can collect. Implement at least 3 different upgrades.

After launching the application, it displays the main menu consisting of the following options:

- New Game
- High Scores
- Exit

When starting a new game, the player is asked for the size of the board. Implement at least 3 different boards of different sizes. After selecting the board size, the generated game board (the look of the board itself can be pre-programmed, so there is no need for an algorithm generating mazes) is displayed in a new window.

A fully functional graphical interface should be provided. CLI can only help the programmer, but there can be no interaction with the user.

During the game, the score counter, time counter, life counter, and other necessary elements of the graphical interface must be visible and will be constantly updated during the game.

You also need to use graphic files and create a cohesive look for the entire application, including all application windows.

Create stop motion animations for character movement and perform actions (e.g., walking animation, eating animation, etc.). Animation example: <http://pj.edu.pl/pacmanAnim>

Implement animations yourself based on threads and images, not, e.g., through GIF files.

All things related to the passage of time must be done using the Thread class (the Timer, Executor, and other classes are not allowed). The careful and correct synchronization of all threads must be ensured. Different functionalities cannot be combined into one thread.

The game is played according to the rules mentioned above. It should be possible to interrupt the game at any time, which will return you to the main menu.

At the end of the game, the player is asked for the name under which they want to be saved in high scores. Provide high scores persistence using the Serializable interface.

After selecting the High Scores option from the main menu, it is displayed to the user. The ranking should be implemented using the JList component. Because the High Score window can be large, take care of the scrollbars.

Implement the application using good programming practices, with complete event handling implemented by the delegated event handling model.

Hints:

- Take care of exceptions in the application. If any occurs, display appropriate messages to the user.
- Take care of the scalability of application windows.
- Dialog windows can be used for smaller and informative windows.
- **Remember to adhere to the formal requirements regarding the rules for submitting and sending projects described in the course rules!**

Attention:

- In the case of receiving a project that does not comply with the requirements or with significant deficiencies in implementation or a non-compiling solution, the result for such a project will be 0 points.
- It is impossible to use WYSIWYG tools to generate windows (e.g., Window/Scene Builder).
- The use of any AI tools in the implementation of the project is prohibited.
- Please remember not to share your solutions anywhere other than in the Assignment.
- Lack of knowledge of any line of code or high similarity of the submitted solution to another solution will result in failing the subject.

- Not only will the practical and substantive correctness of the solution be assessed, but also the optimality, quality, and readability of the code written by you.
- An important part of the project is the use of inheritance, collections, interfaces or abstract classes, lambda expressions, Java Generics, additional functionalities, and other elements discussed during the semester.
- **Be careful about other technologies (pure awt, JavaFX) in your projects!**
Using other technologies, where you could have used Swing components, will result in cutting points!
For instance, if you use pure awt by overriding the paintComponent method to draw the whole map, instead of shaping it using Swing components, your points from the project are going to be reduced.
The main goal of the project is to prove your knowledge of Swing.