

Gebze Technical University
Computer Engineering Department
CSE443 - Object Oriented Analysis and Design
Fall 2021-2022
Homework 1 – v1

Rule 1: Detected cases of plagiarism will lead to a penalty of your grade at the end of the semester.

Rule 2: no late submissions! Even if it is late by one minute, it will be ignored. Learning to plan your schedule according to deadlines is part of your education and an invaluable professional asset.

What to submit: a) the source code of your project *fully documented (with javadoc)*, b) a nicely formatted pdf report of your design decision explanations and class diagrams and c) an executable demo.

Java version ≥ 9

The martial arts clothing company “Uçan Tekme A.Ş.” is about to release a new clothing season, and they have asked your company “Yakan Top Turizm İnşaat Nakliyat Danışmanlık Teknoloji Ticaret ve Limited Şirketi” to produce a relevant computer game for marketing purposes.

The customer is asking for:

- a) A 2D side-scrolling video game (such as Sonic, Mario Bros, etc); meaning that there will be one main character moving to the right at constant speed (basically it's the scenery that moves, while the character always remains at a fixed spot on the screen).
- b) The character is allowed 2 actions: jumping when the spacebar is pressed, and moving to the right when the D keyboard key is pressed. The environment where it moves is assumed flat, with occasional/random immobile monsters/obstacles of constant and jumpable height.
- c) The game window will be divided into 2 parts, the upper part for gaming, and the lower part for printing debug/text messages; one message per line. You are expected to print the actions of the character.
- d) There will two types of jumps, low and high. In case of each, you will print respectively, “low jump” and “high jump” in the message area. The customer wants this functionality to be implemented with the Strategy design pattern, since they plan on adding new jumping styles in future versions of the game. Initially the character jumps low; high jump is enabled when the appropriate powerup is acquired.
- e) If the character fails to jump over the monster/obstacle, and collides with it, the gamer will lose a life (of which she has 3). If the jump is successful, the gamer earns some points. The points earned will be printed as a message.
- f) The character will randomly also encounter powerups; and if it collides with them they will be considered acquired. There will be 3 types of powerups: A, B, C. They will act as multipliers for the points earned per jumped obstacle. A: x2, B: x5, C: x10. Their effect will be cumulative; e.g. acquiring B after C, means the score multiplier is x50 and so on. The customer is asking you to use the decorator pattern in order to implement this functionality, as they intend to add additional

powerups in the future. The acquired powerup will be printed as a message. The fourth type of powerup D will change its jump mode (from low to high or from high to low).

g) The customer has given you full artistic freedom. You can draw/design the environment/character/powerups/obstacles as simple or as complicated as you want; e.g. the main character can be a rectangle, the obstacles can be triangles, and so on.

Rules:

- a) Satisfy the customer's needs, and strive for a reasonable gaming speed (at least 10 frames per second, to be printed at the top left corner).
- b) Both Java Swing and FX are acceptable as visual libraries.
- c) Your game must have start/pause/exit buttons in its menu.
- d) If it freezes for any reason -90. You are expected to use threads properly.
- e) Implementing the strategy pattern correctly +20
- f) Implementing the decorator pattern correctly +20
- g) Deliver a working game satisfying the customer's needs and these rules +40.
- h) Javadoc, reports, etc: +20

Have fun.