

# 420-203-RE – Programming in Graphical Environment

## Assignment 4 – Space Invaders!

Worth: 12.5% of your semester grade

Score: / 10

Due: Monday, December 4<sup>th</sup>, end of day

Teams: To be done individually, or in teams of 2 maximum

### Topics

- Video Game Programming with JavaFX
- Importing, loading and drawing contents
- Mapping Controls to Game Objects
- Collision detection between 2D Game objects (circular colliders)

### Description

Using the JavaFX framework, it is relatively easy to implement a video game while understanding how all of the gameplay is implemented. For this assignment, you will have to reproduce the core elements of a classic video game released in Japan by Taito in 1978: *Space Invaders*!



## Mandatory tasks to complete [6 points]

### **1. Core Engine and Assets [1.5 points]**

- a) Setup a JavaFX project, find assets you need for the game (images, music, sound effects). The assets don't need to look like the original game, but the mechanics must be similar (as described below)
- b) Pre-load all the game assets by implementing an Asset Manager class

### **2. Player Space Ship and Controls [1.5 points]**

- a) Moving the mouse will control the position of the space ship. You can use the exact mouse x coordinate for the position. Left clicking will shoot a projectile upwards.
- b) When the spaceship collides with an alien (enemy), or an alien projectile, the game is over.

### **3. Aliens (Enemies\_ [2 points]**

- a) Aliens are laid out in a grid as in the original game (for example 8 columns wide and 4 rows high). They will move from left to right over time and slowly move downwards
- b) Aliens randomly shoot downwards. They are not affected by their own projectiles

### **4. Game Presentation [1 points]**

- a) Your game must play background music
- b) There should be a sound effect when you shoot a projectile and when an enemy is shot
- c) When all enemies are shot, you should see a "Victory" message on the screen. When your spaceship is destroyed, you should see a "Game Over" message on the screen.

## Additional tasks, you must choose from the list [up to 4 points]

- Add a start menu to the game [1 point]
- Add 3 lives to the player [1 point]
- Add a score, every time you shoot an enemy, the score increases [1 point]
- Make enemies flash when they are shot [1 point]
- Add multiple sprites for enemies, animate them when they move from left to right [1 point]
- Add shields like the original game [1 point], if shield slowly disintegrate [2 points]
- Add a personal twist to the game, verify with your instructor for how many points it's worth...

### **Submission**

You can zip your Netbeans project and submit it on Omnivox (Assignment 4). The assignment must be done individually, or in teams of 2. It is not acceptable to copy/paste or paraphrase another team's assignment. To collaborate, you can help a classmate debug his code, explain your approach, but never share your code! Such practice would be considered plagiarism.

Late submissions are penalized by 10% per day, and won't be accepted after one week past the submission deadline.