Software Methods and Tools

Fall 2016

Assignment 3

Due on 11:59PM, Wednesday, September 21, 2016

1. (50 points) Create a sequence diagram for the Asteroids video game. The diagram should define the main logic of the game in each clock cycle (e.g. clock tick), and the whole game can be seen as a repetition of the logic. Your sequence diagram must include the instances of the following classes: *Clock*, *GameBoard*, *Player*, *Asteroid*, and *GameControl*. Feel free to add more participants if you think it is necessary.

In addition, your sequence diagram must reflect the following activities. You need to figure out how they should be organized (e.g. the occurrence condition and order), and represent them as interactions between participating instances of the sequence digram. Note that each activity below does not necessarily correspond to an interaction message.

- Moving asteroids (i.e. updating asteroids' positions)
- Moving the player (if the corresponding keys are pressed)
- Moving bullets
- Firing a shot (if the corresponding key is pressed)
- Checking if an asteroid is hit by a bullet
- Checking if the player collides with an asteroid
- Updating the game's information (e.g. status, score, time elapsed).

2. (30 points) Create a state diagram for the *GameControl* class. It must include at least four states: *GameOver*, *GamePaused*, *MovingToNextLevel*, and *NewGame*. For each state, include state name and activity when applicable. For each transition, include event, guard, and activity when applicable.

Add the screenshots of your sequence diagram and state diagram in a pdf document. Briefly describe the design of each diagram in your document. Please make sure that the included pictures are clear to read.