

Object Oriented Programming assignment 7:

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(a) the Aliens formation:

There is a basic alien class which is naïve – knows to shoot when being told and to move when being told. (by the column which will be described next). It is a hittable object, and when it is hit it changes its state to dead. A listener removes it from the sprite and hittable collections.

The alien column class is implementing the "alien container" interface. It has a list of five aliens, and it knows the borders of itself. Its most important function is to keep track of its bottom most alien, and when being told to shoot, make that alien shoot.

The alien group is also an alien container, and it has a list of ten alien columns. It chooses a column by random every half a second and orders it to shoot. It is responsible for the whole movement: it asks the columns for their borders, and moves accordingly when it reaches the left or right ends of the screen.

(b) the shields

The shields are blocks which are hittable objects. They notify both the shield remover and the bullet remover when they are being hit.

(c) shots by aliens

Explained in the formation section. The group orders a specific column, the column orders an alien. There is a time counter field which is incremented by dt when the time passed sprite function is called. When the counter reaches 0.5 seconds it chooses a column as described, and the counter is reset.

(d) shots by player

The space ship has a keyboard sensor as a private field. It has a time counter field that is incremented by dt . only if the counter is over 0.35 and the space key is pressed, the space ship creates a bullet, and the counter is reset.

Classes and interface:

Package: geometry

Very similar to the previous game geometry package of point, line and rectangle. Some method were removed in order to simplify the classes, but it supports only left/right/up/down movement. (not a more complicated movement). Also, the Velocity class is not included for the same reason. There are only two types of simple movement, implemented by the specific classes.

Package: animation

Also very similar to the previous animation package of animation interface, runner, high score table and informative screens like the game over animation.

Package: menu

The same but has no sub-menu, and no different levels.

Package: base components

Interface:

Alien container. There are two types of alien containers, a column and a group of columns. They should be able to make what they hold move at the same time. They should also command one of the things they hold to shoot. They know their four borders.

Classes:

Alien. Is a Sprite, a Hittable and a shooter. The basic alien, that can detect when the ball hits it, notify the hit listeners of the hit, and disappear from the game. Can move only from the alien column.

Alien column. Has a list of five aliens. Is a shootable and an alien container. The shoot function tells the bottom most alien to shoot.

Alien group. Has a list of ten columns. Is responsible for the entire group movement, and choosing a column to shoot every 0.5 a second.

Bullet. Is created by a shootable. Is a sprite, and has a list of all the hittable objects in the game. The list is updated every move.

Shield block. Similar to the blocks of the previous assignment. Is a sprite and hittable. And notifies the block remover listener when is hit.

Space ship. Is a sprite, a shootable and a hittable. Moves similarly to the paddle. It is able to create a bullet by the bullet creator object. If it gets hit it notifies a listener that takes the lives counter down by one and restarts the turn.

Package: logic

The counter, score tracker, sprite, sprite collection and hit listener are practically the same. The colidable interface is called hittable, and it is also practically the same.

Interfaces:

Shootable. Has a bullet creator.

Classes:

Alien killer. Hit listener that checks if the alien is hit, and removes it from the game.

Bullet creator. Every shootable has one. It creates a bullet with specific properties and adds it to the game.

Bullet remover. Hit listener that removes the bullet for every hit.

Shield block remover. Hit listener. When a shield block is hit, removes it from the game.

Space ship listener. Notifies the game to start a new turn and take the lives counter down by one.

Package: initialization

Has a main class that gets the game level that needs to be initialized, the keyboard sensor, the lives and score counters and the level number. There are four initializing classes: for the aliens, the shield, the spaceship and the background.

Package: game

Has game level and game flow like the previous game but much more simple, with only one level type that differs by its number. This number is later translated to the aliens initial speed.

Default package: main

Starts the GUI, runner, keyboard and high scores. Creates a menu and runs it like the previous assignment.