

Assignment 7 – Space Invaders

List of classes and interfaces:

I used most of the classes and interfaces created through assignment 1-6, other than that, new added features:

- Enemy – extends Block. Unlike Block, Enemy can move and has specific worth.
- Enemy Creator – similar to block creator from previous assignment, this one creates enemy by given point (x,y)
- Formation – controls enemies as a unit. Moves them together, always knows it's boundaries, acts as a group (in case of collision into the shields/moving/ if all enemies died)
- FormationListener – new Interface especially for the Formation. Deals with colliding shields and death of all objects in the formation.
- HitNotifierPaddle – unlike previous assignments, in this one when the paddle gets hit the player loses lives.
- HitPListener – (Similar to the Hit notifier – Hit Listener for blocks) here used as the Hit listener of the paddle. This interface deals with objects colliding the paddle.
- ShieldBlocksCreator - by given point, creates a shield made out of blocks. (implement Block Creator)

No more New classes/interfaces were added. In order to make the game run as requested I just made some changes in Game Level / Game Flow. (adding members such as the time for each shoot, the formation as a member, sending a number of level which controls the speed, etc....)

Implementation:

Formation – the formation is made out of linked list of linked lists. (main linked list of 10 enemies, which each link holds another linked list of 5 enemies. 5X10 matrix). The formation is always aware of it's boundaries (by using a knowBoundariesEnemy method), by knowing it's limits it can controls it's movement (changing directions when hitting walls, acting when hitting the line of the shields, and being aware if there are no more enemies – calling an "allDead" method). When creating this class it should be passed an x,y start, the line of the shields and a speed). The constructor uses the "Enemy Creator" class in order to create each enemy.

The shields - by holding a shield creator (implementing block creator) it can create single shield made out of 3 rows and 28 columns of blocks by given point. For each block in the shield we're adding listener so if a ball hits part of the shield, the specific block disappears.

Shots By Aliens – the formation holds a method which returns a point (chosen randomly out of the lowest enemies of each column), in game level – every 0.5 seconds the class is asking for a new point from Formation, by this point, game level creates a new ball and adding it to an "EnemyBalls" list. Later on when this ball will hit an object, before removing that object from the game, game level will check who's ball is it. When hitting another enemy, if the ball is of another enemy we wont remove his fellow enemy, but when hitting other object – the program will remove them.

Shots By player – in this case every 0.35 seconds the game level will check if the player is pressing "space". If so, it will create a new ball (from the center of the current location of the paddle) and add it to a "PlayerBalls" list. When a player ball hits another object, the other object should be removed. (if it hits an enemy, it should also ask for it's worth and add it to the score counter)

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