Due Date

The exercise must be submitted by midnight Monday, February 8, 2016. Each team must submit their game via the course canvas web site.

You are to submit only your game file, named TeamName_Assg1.gm81, where TeamName is your student team name.

Assessment

This exercise comprises 15% of the total assessment for the course. This is a team exercise; assignments will also be accepted from individual students. Team assignments will be assessed on correct functionality of the items listed below.

The team game must include a game information page which lists the students in the team who contributed to the development of the game. Any student whose name does not appear in the game information page will receive no credit for the assignment.

Requirements

You are to develop a space invaders game, using Game Maker. The aliens are invading and flying various spacecraft over the planet, dropping bombs. The player can save the world by fighting off these nasty invaders with a single gun.
The player has some fortification, built from blocks. When an invader bomb hits a block, the block is damaged. After 5 bomb hits, a block is destroyed.

The gun can be moved by the player using the left and right arrow keys, and can be fired by the player pressing the space bar. The gun cannot fire continuously, so you need to put a delay (try a delay of 20 steps) for the gun to be reloaded. The gun fires a bullet which, if it hits an invader spaceship, causes an explosion and damages or destroys the spaceship.

If a bullet hits a fortification, block, it destroys the block, with an explosion.

The player does not have an unlimited supply of ammunition. Start off with 20 rounds and decrease the ammunition count by 1 each time the gun is fired. When the ammunition count reaches 0, the gun cannot be fired. At random intervals (random(1000) seems about right), an ammunition box should appear at a random position near the bottom of the screen, where the gun can be moved to fetch it (collide with it), increasing the ammunition count by 20. If a bomb hits the ammunition box before the gun reaches it, the ammunition box is destroyed, with an explosion.

Note that a bomb or bullet which misses everything, and goes out of the playing area, should be destroyed (just so we don’t clutter up the game with a lot of bombs and bullets which are out of sight).

GIF files are provided for 4 types of alien spacecraft, each facing left to right or right to left. You are not restricted to using these sprites. The spacecraft drop bombs at irregular intervals – use the random() function in an alarm setting to specify the number of steps between bombs.

Your game needs to introduce more and more invader spacecraft, of different types as the game progresses. The invader spacecraft should have different characteristics:

- They have different sprites.
- They fly at different speeds and at different altitudes.
- Some drop bombs more frequently than others.
- Some appear more frequently than others.
Some may take several bullet hits before they are destroyed (although, you should still show an explosion whenever they are hit).

- The player's score increases by different amounts for different types of spaceships.

You need to keep score of the invader spacecraft that the player manages to destroy before the player’s gun is destroyed and the game is over. When the game is over, show the high score table and give the player the option of playing again.

Note that if you use the “health” variable to keep track of the ammunition count, you can display the ammunition count in the game caption bar, along with the score.

**What you must do**

To get full points for the assignment, your game must include the following features:

1. The gun must be at the bottom of the room and must be movable with the left and right arrow keys and must fire bullets with the space bar, with a delay between firings.
2. The game must maintain an ammunition count to limit the firing of the gun and this must be replenished by fetching ammunition boxes, which appear at random positions and at random times.
3. The player’s fortification must be built from blocks, stacked at least 3 high, with spaces left for the gun to fire through.
4. You must use at least 3 types of invader spacecraft. The different types must display different behavior, such as flying at different heights and speeds.
5. The bombs dropped by the invaders must damage and eventually destroy the fortification blocks.
6. The gun’s bullets must destroy the spacecraft, with an explosion, and add to the score.
7. The invader’s bombs must be able to destroy the gun, with an explosion, resulting in display of a message announcing that the game is over and giving the player the choice of restarting the game or ending it.
8. The game must create new instances of invader spacecraft, making the game increasingly difficult.
9. An information page, which includes the name of the game, the authors and date. It must also tell the player what the game is about and what controls the player has in the game.

**Other things you can try**

There are many things that you can add to your game, to make it more challenging, more interesting, more fun:

1. Give the player the option of restoring the crumbling fortification. A fortification block can appear at random intervals in the same area as the ammunition box. Then the player can use the keyboard to move the block into place. Use keys different to the arrow keys used for moving the gun. The new block needs to be a different object to the other blocks (otherwise they would all move). Once the block is in place the player can change it to an ordinary (non-movable) block by pressing some special key.
2. Give the player several lives, so that the game does not end when the first bomb hits the gun, the player loses a life. The game ends when all the player’s lives are exhausted.
3. Give the player a secret weapon, a missile hidden under the fortification. The missile can only be used once but destroys any invader spacecraft within a set radius of the first one that it hits.
4. Give the invaders a special gun-seeking missile which steers itself toward the gun, based on its observations of bullets.
5. Make some invader spacecraft move toward the earth. If they crash into the fortification or the gun, it should have the same effect as 5 bomb hits.

6. Give the player a spacecraft which can be flown among the enemy craft and shoot at them.