

Jack-in-the-box

<https://notendur.hi.is/~dia2/203M/Verkefni/Verkefni1/Jack-in-the-box.html>

<https://github.com/isebarn/HaskoliIslands/tree/master/203M/V1>

-----Basic features-----

In the game you use the arrow keys to move the triange (jack)

The right/left arrow keys move jack sideways and the up arrow button jumps/leaps

Following jack is a gun that follows jack and shoots him once the gun is directly above him

Jacks objective is to collect 13 coins in the first level, and jump into the portal leading to level 2

There, jack also must collect 13 coins

There is no kill-screen or end-screen. Once jack has collected 13 coins in both levels, coins stop appearing

There are 2-3 coins in the game simultaneously. Sometimes coins are on the same place, so reaching those would give 2-3 points instead of one point. Coins only 'live' for a short time before they disappear
If Jack collects a coin, a new one wont appear immedietally

The 'crash-physics' of the levels differ slightly. In the first level, Jack cannot hit the sides of the boxes, he can only land ontop of the platforms

In the second level jack can crash into the platforms

Jack can always jump through platforms from below

The gun that follows Jack around has a single bullet. The gun simply follows jack and wheter jack is right below or far below, the gun fires the bullet once the gun is directly above

Once the bullet has been fired, the gun will reload either when the bullet leaves the screen or if the bullet hits Jack

Jack has as many lives as coins he has collected. However, as previsously stated, there is no kill-screen so if Jack runs out of coins and gets hit, it wont 'end' the game. However the gun will keep firing at Jack bringing him to a 'debt'

The gun's speed and the bullets velocity depends on wheter Jack is in level 1 or level 2

When Jack collects a coin, a score-coin appears on the bottom of the screen, right under the 'ground' platform

-----Collision detection-----

All objects in the game that Jack may interact with in some way have their own 'contact()' function
Every time Jack moves, he calls the 'contact()' function of all objects to invoke a reaction, usually based on boolean attributes that Jack has, such as running, landing, jumping etc

The platforms react differently whether Jack is landing, running, leaping or falling and also depend on wheter Jack is at level 1 or level 2

The bullet simply check for a hit, as do the coins

The functions used for collosion detection are:

above(objectA, objectB) - returns true if objectA has a higher y-coordinate than objectB
clampX(objectA, objectB) - returns true if objectA's x-coordinate is between objectB's x-coordinate and its x-coordinate + its width
clampY(objectA, objectB) - returns true if objectA's y-coordinate is between objectB's y-coordinate and its y-coordinate + its height

locationDifferenceY(objectA, objectB, sensitivity) - returns true if objectA's coordinate is within objectB's y-coordinate +/- the sensitivity

Jack also has a method called front(), back(), raise() and lower()

These methods increase Jack's x-coordinate by his length, decrease it, or increase his y-coordinate by his height, and decrease it

This is due to the fact that Jack's x/y coordinates are single points, the point of Jack that touches the ground. These functions simplify the clampX(), clampY(), locationDifferenceY() functions, so it is convenient to fx call in this order:

```
jack.front()
clampX(jack, platform[4])
jack.back()
```

To check if Jack's nose is within a platform but his actual coordinates are. Jack only lands on a platform if his 'feet' land on it, not the nose

----- .js Files -----

coins.js - are the functions necessary to create the coins lying around
controls.js - are the functions conected to the keyboards arrow-keypresses
enemy.js - are the functions to create the gun-object and the bullet-object
gateway.js - creates the gateway that appears once jack has 13 coins in level 1
helpers.js - has all the collision-detection functions and a function to create circles
jack.js - creates the Jack object
levels.js - are simply constructors for level1 and level2 to build the platforms, and a functino to change levels
physics.js - the function for gravity for when jack jumps.
platforms.js - the function to create platform objects
scoreKeeper.js - the function t o create the array that keeps score, aswell as the score-circles

All these files have brief documentation, but all methods and object attributes are named clearly so there should be no ambiguity what is going on, and most methods are 'one-liners', as is custom

----- Basic control flow -----

The control flow of the program is in the hands of the Jack-in-the-box.html file

The render() function begins by calling Jack to see what has changed since the last time he was drawn

Jack calls his own contact() method that calls the contact() method of all the other objects (that have one) and redraw accordingly