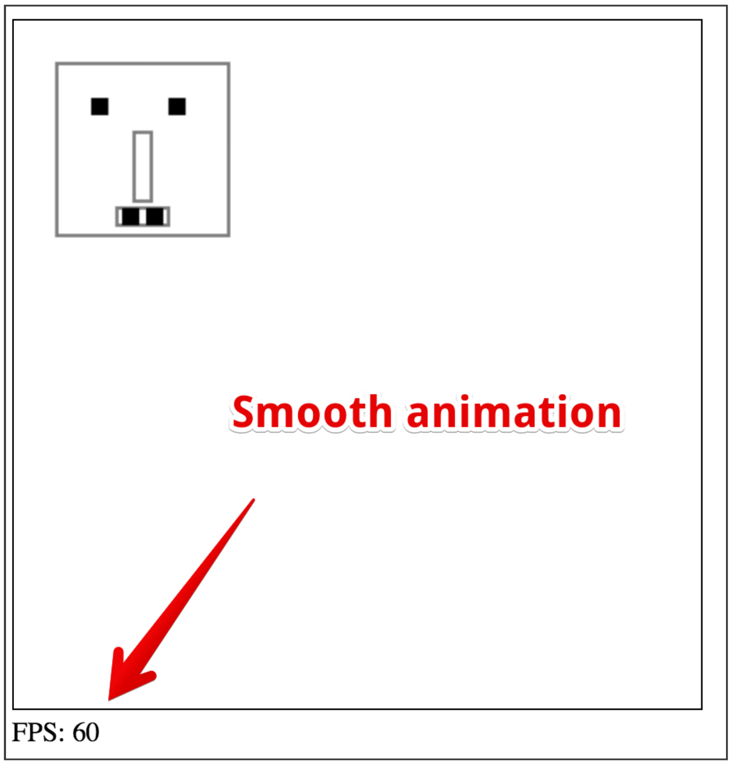
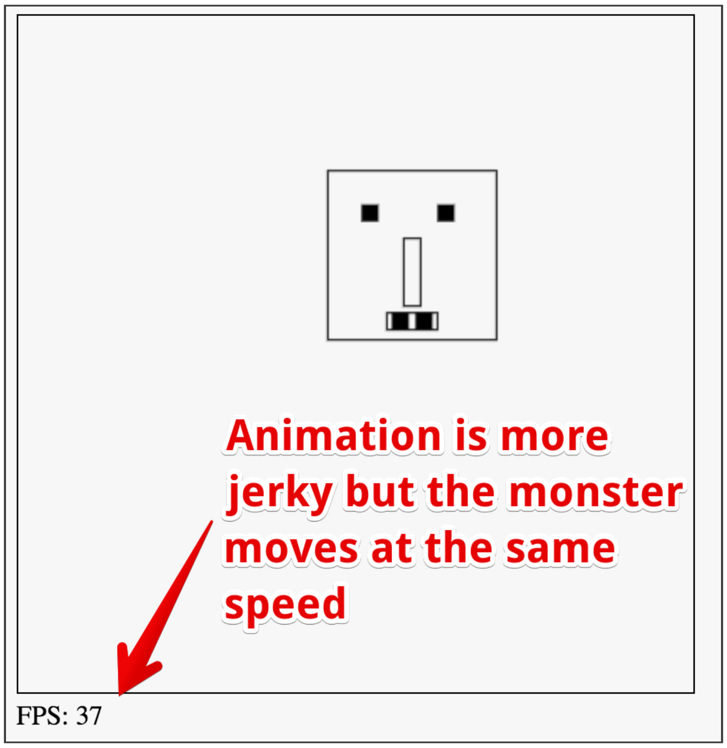
Adding time-based animation to our game engine

To add time-based animation to our game engine, we will be using the last technique discussed in the previous lesson. This technique is now widely supported by browsers, and relies on the timestamp parameter passed to the callback function (`mainLoop`) by the call to`requestAnimationFrame(mainLoop)` to add time-based animation to our game framework.

Here is an online example of the game framework at JSBin: this time, the monster has a speed in pixels/s and we use time-based animation. Try it and check the smoothness of the animation; the FPS counter on a Mac Book Pro core i7 shows 60 frames/s.



Now try this slightly modified version in which we added a loop inside the animation loop that will take some time to execute. This should slow down the frame rate. On a Mac Book Pro + core i7, the FPS drops down to 37 frames/s. However, if you move the monster using the arrow keys, its speed on the screen is the same, except that it's not as smooth as in the previous version, which ran at 60 frames/s.


Animation is more jerky but the monster moves at the same speed
FPS: 37

HERE ARE THE PARTS WE CHANGED

Declaration of the monster object - now the speed is in pixels/s instead of in pixels per frame

```
// The monster !
var monster = {
  x:10,
  y:10,
  speed:100, // pixels/s this time !
};
```

We added a `timer(currentTime)` function that returns the `delta` of the time elapsed since its last call

We use it from the game loop in order to measure the time between frames. Notice that this time we pass the delta as a parameter to the`updateMonsterPosition` call:

```
function timer(currentTime) {
   var delta = currentTime - oldTime;
   oldTime = currentTime;
   return delta;
}
var mainLoop = function(time){
   //main function, called each frame
   measureFPS(time);

   // number of ms since last frame draw
   delta = timer(time);
   // Clear the canvas
   clearCanvas();
   // draw the monster
   drawMyMonster(monster.x, monster.y);
   // Check inputs and move the monster
   updateMonsterPosition(delta);
   // call the animation loop every 1/60th of second
   requestAnimationFrame(mainLoop);
 };
```

Finally, we take into account the delta time in the`updateMonsterPosition(...)` function

```
 function updateMonsterPosition(delta) {
   ...
   // Compute the incX and inY in pixels depending
   // on the time elapsed since last redraw
   monster.x += calcDistanceToMove(delta,monster.speedX);
   monster.y += calcDistanceToMove(delta,monster.speedY);
 }
```