



# LAB 09:

## Complex Movement & Collision Maps

### Provided Files

- example.gba
- main.c
- myLib.c
- myLib.h
- game.c
- game.h
- house.bmp
- house.c
- house.h
- spritesheet.bmp
- spritesheet.c
- spritesheet.h
- collisionmap.bmp

### Files to Edit/Add

- game.c
- collisionmap.c
- collisionmap.h
- Makefile
- .vscode
  - tasks.json

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### Instructions

In this lab, you will be completing several different TODOs, which will, piece by piece, add complex sprite movement. Your code may not compile until you complete an entire TODO block, at which point the game should compile with a new component of the final outcome (unless otherwise specified).

#### **TODO 1 - Complex Camera Movement**



We want our pikachu to walk only on the screen, and have the camera follow it without showing something outside of the world.

- TODO 1.0
  - In `game.c`, in the `updatePlayer()` function, add in the sprite and camera movement.
- TODO 1.1
  - In `game.c` in the `drawPlayer()` function, set pikachu's *screen* row and column in the `shadowOAM`
    - Hint: the screen row is the world row minus the background vertical offset; the screen col is the world col minus the background horizontal offset

Your pikachu should now be able to walk around and see the entire map, but not off of the edge. The pikachu should always be in the middle of the screen unless at the edge of the map (see the `example.gba`).

### TODO 2.0 - Collision Map

Now we want our pikachu to treat the visuals of the map as if they were actual barriers to movement.

- TODO 2.0
  - The collision map has been created for you. Open `collisionmap.bmp` in Usenti and export it. Remember that we want to check the colors of each pixel, so take that into account when choosing export settings. As such, export the collision map as `bitmap(GBA)` and select 16 bpp. Uncheck the Pal box.
- TODO 2.1
  - Include `collisionmap.h` in `game.c`.
- TODO 2.2
  - Update your movement code to only allow pikachu to move if the collision map allows it (is white) in the areas that you need to check. Your pikachu should not be able to walk over the house or the bushes. The pikachu should be able to walk between the house and the bushes on the right and top, in both directions.

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### You will know if it runs correctly if you:

- Your `project.gba` has the same behavior as the `example.gba` provided for you. The `example.gba` pikachu is green, but `project.gba` pikachu should be yellow.

### Tips



- Review recitation materials: Canvas > Recitation Materials
  - Complex movement
  - Collision maps

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## Submission Instructions

Zip up your entire project folder, including all source files, the Makefile, and everything produced during compilation **(including the .gba file)**. Submit this zip on Canvas. Name your submission Lab09\_FirstnameLastname, for example: "Lab09\_TeamRocket.zip".