

IDMT 2020

Assignment 2

(Version: 20201015)

This assessment is 10% of your total IDMT module grade.

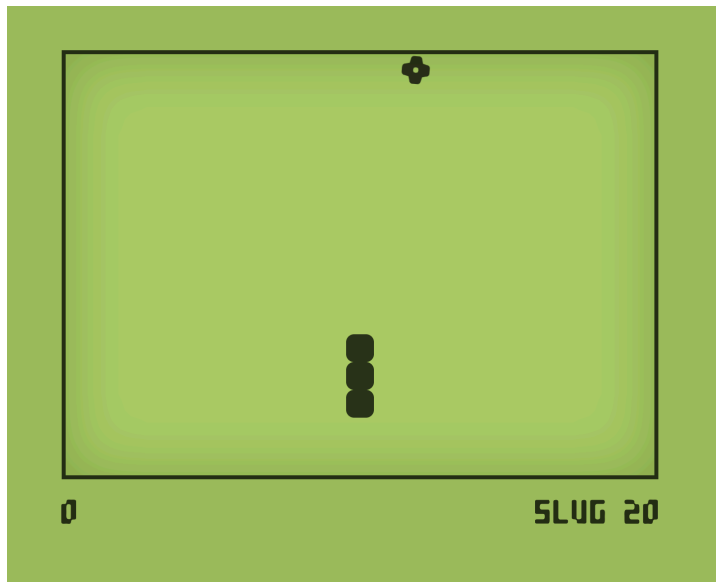
The purpose of this assignment is to help you become familiar with using Arduino to create digital media interfaces. You will use Arduino to control the simple snake game you created using Processing in Assignment 1.

Recap: How the Snake game is played

Example game:

<https://playsnake.org>

(Keys for this example version are: left: A; right: D; up: W; down: S)



Snake starts at 3 units long and is always moving forward.

Use Arduino buttons to change direction of snake: left, right, up, down.

Snake dies when it hits the wall or runs into itself.

Each time the snake eats an apple the points increase.

Instructions

You should write **3 pairs of Arduino and Processing sketches** – one pair of sketches for each of the steps below. Each step builds on the previous one, so make copies of your code as you move from one step to the next. Each sketch should be self contained, be runnable without modification, and include all the functionality of the previous steps as well as the current step.

Step 1: Control the direction of the snake with 4 buttons (sketch name: Step1)

Connect 4 buttons to Arduino. Write an Arduino sketch and modify your Assignment 1 final Processing sketch so that the buttons connected to Arduino control the direction of the snake (left, right, up, down) instead of the keys on the computer keyboard.

Hint - Remember to include resistors.

Step 2: Control the speed of the snake with a potentiometer (sketch name: Step2)

Connect a potentiometer to Arduino (in addition to the 4 buttons). Write an Arduino sketch and modify your Assignment 1 final Processing sketch so that in addition to the 4 buttons controlling the snake's movement, the potentiometer controls the speed of the snake's movement from slow to fast.

Step 3: Make a motor spin when the snake hits a boundary (sketch name: Step3)

Connect a motor to Arduino (in addition to the 4 buttons and 1 potentiometer). Write an Arduino sketch and modify your Assignment 1 final Processing sketch so that in addition to the 4 buttons controlling the snake's movement and the potentiometer controlling the snake's speed, the motor spins when the snake hits one of the four walls (collision detection - this was Step 3 of Assignment 1).

Marking Scheme

You receive the following % of your overall IDMT module grade.

Step	Sketch pairs	Description
Step 1	0%: Not working at all 1%: Partially working 2%: Fully working	0%: No description or a list of comments from the code 1%: Unclear description 2%: Clear description
Step 2	0%: Not working at all 0.5%: Partially working 1%: Fully working	0%: No description or a list of comments from the code 0.5%: Unclear description 1%: Clear description
Step 3	0%: Not working at all 1%: Partially working 2%: Fully working	0%: No description or a list of comments from the code 1%: Unclear description 2%: Clear description

Submission

Your submission should consist of the following:

- 3 Arduino and 3 Processing sketch folders containing the code for each step above. Your code should include clear comments to explain what each line of the code does. Make sure to credit any code that you have used in your sketches.
- Short report (PDF, max 2 sides of A4) describing how your code works for each step above as well as a circuit diagram of the circuit connected to Arduino. There should be an explanation for each step – explain what the important variables are, why you use those variables, and how the code achieves the objectives of each step i.e. how it works and why you wrote it that way. Explain how the circuit works and why you made it that way. Make sure to credit any code that you have used in your sketches and explain how your code is different. You should include a section on your reflections about your code and how it works. This report should be written in plain English and should not just be a summary of the comments in your code.
- Name your files with your initials and surname and student number
- Make a .zip or .tar.gz file of all your code and report and submit it via QMplus
- Make sure the filename of the file you submit to QMPlus includes your initials, surname, and student number

Remember to include your name and QMUL email in both your code and report