

UNIVERSITY OF LONDON

GOLDSMITHS COLLEGE

Department of Computing

B. Sc. Examination 2017

IS51008C

Introduction to Programming

Duration: 2 hours 15 minutes

Date and time:

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*This paper is in three parts: part A, part B and part C. There are 6 questions in part A, 1 in part B and 3 in part C. You should answer 4 questions from part A, the 1 question in part B and 2 questions from part C. Your answers to part A should be written in separate answer book to the answers to part B and C.*

*Full marks will be awarded for complete answers to a total of 7 questions, 4 from part A, 1 from part B and 2 from part C. The questions in part A carries 5 marks each. The question in part B carries 8 marks. Each question in part C carries 6 marks. The marks for each part of a question are indicated at the end of the part in [.] brackets.*

*Each part of the question in part B is multiple choice. You should choose one and only one answer and write down the letter of your chosen answer*

*There are 40 marks available on this paper.*

*No calculators should be used.*

**THIS PAPER MUST NOT BE REMOVED  
FROM THE EXAMINATION ROOM**

**Part A**  
**Your project**

Answer four questions from this part.

All of these questions will be marked based on the quality of the code and coding process *as you describe it*. Marks cannot be awarded unless your description shows clear understanding of the code.

**Question 1** Describe how you used objects in your project. Give 2 examples [5]

**Question 2** Describe how you used loops in your project. Give 2 examples [5]

**Question 3** Describe 2 functions in your program. Explain the differences between them, particularly in terms of parameters, returns and use of variables [5]

**Question 4** Describe 3 variables in your program, explaining their purpose [5]

**Question 5** Describe the part of your program that you are most proud of. [5]

**Question 6** What was the best advice you were given about your project? Describe how you used it to create code (with an example). [5]

**Part B**  
Multiple choice

answer all question in this part

**Question 7** Each question has one correct answer

(a) You have created a prototype of a game which includes a single enemy. You now want it to have many enemies. What would you use to achieve this? [1]

- a) an array
- b) an if statement
- c) a class
- d) the draw function

(b) The following code is supposed to draw dots at the mouse position that get bigger the faster the mouse moves, but it does not work. How should it be fixed? [1]

```
1 function pointSize(x, y, dx, dy){
2     return dist(x, y, dx, dy);
3 }
4
5 function draw(){
6     strokeWeight(pointSize(mouseX));
7     point(mouseX, mouseY);
8 }
```

- a) Line 1 should be `function pointSize(x)`
- b) Line 1 should be `function pointSize()`
- c) Line 6 should be `strokeWeight(pointSize(mouseX, mouseY, pmouseX, pmouseY));`
- d) Line 6 should be `strokeWeight(pointSize());`

(c) What is wrong with the following code? [1]

```
1 function setup()  
2 {  
3     createCanvas(100, 100);  
4     var col = 3.5;  
5 }  
6  
7 function draw()  
8 {  
9     ellipse(10, 10, col, col);  
10 }
```

- a) background is not called
- b) the parameters of ellipse need to be whole numbers and col is not a whole number
- c) ellipse should only have 2 parameters
- d) col does not exist in draw

(d) In this if statement, which function is called if a is 10? [1]

```
if(a > 50)  
{  
    function1()  
} else {  
    function2()  
}
```

- a) function1
- b) function2
- c) function1 and function2
- d) neither function1 nor function2

(e) You are writing a pac man clone. In which of these situations are you mostly likely to use an if statement? [1]

- a) you have code to draw a circle and need to change it to draw a pacman shape
- b) you have code to draw pacman and you need code to move him
- c) you have code to draw pacman and a ghost, and you need to check if they have collided
- d) you have code to draw one pill but now you need to draw lots of pills

(f) This code is supposed to pause a game, but the car keeps on moving, what should you change? [1]

```
1  if (paused == true)
2  {
3      text(" paused", width/2, height/2);
4      car.update();
5  }
```

- a) line 1 should read if(paused == false)
- b) line 1 should have a semi-colon at the end
- c) line 4 should be outside of the if statement
- d) the if statement should have an else branch containing line 4

(g) What does the following code print? [1]

```
1  var a = [1,2,3];
2  println(a[3]);
```

- a) 1
- b) 2
- c) 3
- d) nothing

(h) How many circles are drawn by this code? [1]

```
1      for (var i = 0; i <= 10; i++)
2      {
3          ellipse(i*200, 200, 20, 20);
4      }
```

- a) none
- b) 9
- c) 10
- d) 11

## Part C



Answer two questions from this part.

**Question 8** A fellow student has posted the following question on a forum. Answer the question as helpfully as you can.

[6]

Hi, I am trying to make a game with many enemies, but it won't run. What is wrong? Any suggestions for improvement?

```
1   var stars;
2
3   function setup()
4   {
5       createCanvas(400, 600);
6       var stars = [];
7       for (var i = 0; i < 5; i++){
8           stars[i] = {
9               x : 30*i;
10              y : 0;
11          }
12      }
13  }
14
15  function draw()
16  {
17      stars[1].y += 1;
18      stars[2].y += 1;
19      stars[3].y += 1;
20      stars[4].y += 1;
21      stars[5].y += 1;
22
23      ellipse(stars[1].x, stars[1].y, 20, 20);
24      ellipse(stars[2].x, stars[1].y, 20, 20);
25      ellipse(stars[3].x, stars[1].y, 20, 20);
26      ellipse(stars[4].x, stars[1].y, 20, 20);
27      ellipse(stars[5].x, stars[1].y, 20, 20);
28  }
```

**Question 9** Read the following program and answer the questions below.

```
var myArray;
var current = null;
var query = "";

function preload(){
  myArray = [
    {
      name : "FIRST",
      data : loadImage("D_1.jpg")
    },
    {
      name : "SECOND",
      data : loadImage("D_2.jpg")
    },
    {
      name : "THIRD",
      data : loadImage("D_3.jpg")
    },
    {
      name : "FOURTH",
      data : loadImage("D_4.jpg")
    }
  ]
}

function setup() {
  createCanvas(400, 600);
}

function draw() {
  background(255);
  if(current != null){
    image(current, 0, 0, width, height);
  }
  text (query, 10, 40);
}
```

```
function getImage(name){
  for(var i = 0; i < myArray.length; i++){
    if(myArray[i].name == name){
      return myArray[i].data;
    }
  }
  return null;
}

function keyPressed(){
  if(keyCode == ENTER){
    current = getImage(query);
    query = "";
  } else {
    query += key;
  }
}
```

- (a) What does this program do? [2]
- (b) Describe what the variable myArray contains? [2]
- (c) Why does getImage have two return statements? [1]
- (d) What is the if statement in draw for? [1]

**Question 10** This question relates to developing a tile based game. Each level is represented as a grid of square tiles. Each tile can be have one of a number of different types (e.g. grass, rock, forest) each of which has a different appearance and different properties (e.g. different resources, and different times it takes to cross the tile)

- (a) How would you represent tiles in code (give example code)? [3]
- (b) How would you represent the grid of tiles (give example code) [1]
- (c) Given a function to draw 1 tile, how would you draw the grid of tiles (give example code) [1]
- (d) How would you detect when the player clicks on a tile (give example code) [1]