

UNIVERSITY OF LONDON

GOLDSMITHS COLLEGE

Department of Computing

B. Sc. Examination 2019

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, with the following questions*

*There are 3 questions in part A of which you should answer 2.*

*You should answer all of part B.*

*There are 3 questions in part C of which you should answer 2.*

*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 5 questions, 2 from part A, 1 from part B and 2 from part C. The questions in part A carries 10 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 number 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 two questions from this part. These questions all refer to the project you did for this module. Please use a separate answer book for these questions.

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**

What were the most important classes or constructor functions in your program, describe their properties, methods, and how they were used. [10]

**Question 2**

Describe how you used arrays and iteration in your program. [10]

**Question 3**

Describe one difficult logic or syntax error you encountered in your program. Explain how you found and fixed the bug. [10]

The mark scheme for all questions in this part is the following:

- 1-3. a description showing limited understanding of basic code
4. a description of very basic code
5. a description of competent code that uses the techniques taught in class well
6. a description of well designed code that goes slightly beyond what was taught in class
- 7-8. a description of well designed code that goes considerably beyond what was taught in class
- 9-10. a description showing deep understanding of code that is beyond the scope of what would usually be expected at undergraduate level

## Part B

Answer all questions in this part

**Question 4** Each Question has one correct answer

(a) What is the `forEach()` method for? [1]

- i. selecting which code to run
- ii. declaring new methods in an object
- iii. running the same code on each item in an array
- iv. pausing execution of the code for a set amount of time

(b) In the following code which function is called? [1]

```
var x = 7;
var y = "apple";
    if( x < 7 || y != "banana" ){
        funcA(200,200);
    }
    else{
        funcB(300,300);
    }
```

- i. `funcA`
- ii. `funcB`
- iii. Neither

(c) What is the `this` keyword used for? [1]

- i. is a type of string
- ii. represents the current line being interpreted
- iii. a reference to the current object
- iv. makes a variable a property

(d) Upon execution of the following `if` statement what is displayed in the console? [1]

```
var a = 2;

if (a >= 0 && true) {
    console.log("condition met");
} else {
    console.log("condition failed");
}
```

- i. condition met
- ii. condition failed
- iii. an error message
- iv. none of the above

(e) Which of the following draws 4 ellipses to the screen? [1]

- i. 

```
for(var i = 0; i < 60; i+=10){  
  ellipse(i*10, 40, 80, 80);  
}
```
- ii. 

```
for(var i = 10; i < 50; i+=10){  
  ellipse(i*10, 40, 80, 80);  
}
```
- iii. 

```
for(var i =10; i < 40; i++){  
  circle(i*10, 40, 80, 80);  
}
```

iv. None of the above

(f) Which of the following accesses “Elanor” from the groups array? [1]

```
groups = [ ["Colin", "Chris", "Claire", "Catherine", "Cody"],  
           ["Daisy", "Delia", "Derek", "Donald", "Danny"],  
           ["Ernest", "Elanor", "Eliza", "Eric", "Elizabeth"],  
           ["Frida", "Freddy", "Fiona", "Finn", "Fatima"]];
```

- i. groups[1][3]
- ii. groups[2][4]
- iii. groups[2][1]
- iv. none of the above

(g) What does the p5.js map() function do? [1]

- i. adds an item to the beginning of the array
- ii. converts a number from one range to another
- iii. draws a complex polygon to the canvas
- iv. calculates the distance between 2 points

(h) Assuming `a` is a correctly initialised array does the following code throw an error? [1]

```
for(var i = a.length-1; i >= 0; i--){  
  console.log(a[i]);  
}
```

- i. True
- ii. False

## Part C



Answer 2 questions from this part.

**Question 5**

Consider the following array of strings:

```
var cakes = ["victoria sponge", "blueberry muffin",  
"danish pastry", "lemon drizzle", "carrot cake"];
```

- (a) Using the array `splice` method remove “blueberry muffin” from the array. [1]
- (b) Write a `while` loop to display the contents of the array to the browser console. [2]
- (c) Imagine an object that represents a cake in a recipe application. Describe an array that the object may have. Explain how the array might be used and the data type it stores. [2]
- (d) Describe a further property of the cake that can be represented by a single variable not an array. [1]

### Question 6

The following code draws a button to the screen.

```
var c;
function setup() {
  createCanvas(400, 400);
  c = color(255,0,0);
}

function draw() {
  background(220);
  fill(c);
  rect(20,40, 100, 30);
  fill(0);
  text("click me!", 50, 60)
}

function mousePressed(){
//change colour of the button to blue
c = color(0,0,255);
}
```

- (a) What is stored in the variable `c`, how does it effect the appearance of the button [1]
- (b) Rewrite the `mousePressed()` function so that the colour of the button only changes when the button itself is pressed not the whole canvas. [3]
- (c) The button a label are drawn using 'absolute values'. Briefly describe some of the problems of using absolute values and the benefits of alternative approaches. [2]

### Question 7

The following code is the start of a shopping basket constructor:

```
function Basket(shopperName, balance){  
    this.name = shopperName;  
    this.balance = balance;  
  
}
```

- (a) What line of code would be needed to add a property called contents, which stores an array of items added to the basket? [1]
- (b) Write a method for basket constructor called addItem. addItem should take 2 parameters; itemName and price. If the price for the item is less than the balance add the itemName to the contents property, deduct the price from the balance and return true. If the balance is not sufficient return false. [4]
- (c) Complete the following line of code so that the variable sBasket contains an instance of the basket object. [1]

```
var sBasket = ???
```