

UNIVERSITY OF LONDON

GOLDSMITHS COLLEGE

B. Sc. Examination 2013

COMPUTER SCIENCE

IS51015A Computer Science 1

Duration: 2 hour 15 minutes

Date and time:

There are five questions in this paper. Full marks will be awarded for complete answers to a total of THREE questions. If you answer more than three questions your best three will count. Each question carries 25 marks. The marks for each part of a question are indicated at the end of the part in [.] brackets.

There are 75 marks available on this paper.

This is a multiple choice exam. Please fill in the answer sheet at the end of the paper. Negative marking is in operation: You get five marks for each correct answer but lose 1.25 for each wrong answer. If you are not sure, you may decide to leave an answer blank. More than one answer to a single question part will result in a score of zero for that question part.

No calculators should be used.

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

QUESTION 1

(a) What is the output of the following Javascript code fragment:

```
var x=1;
typeof(x);
```

- (i) "object"
- (ii) "string"
- (iii) "number"
- (iv) "function"
- (v) None of the above.

[5 Marks]

(b) Given `var z=["abc","de","fg"];`, what is the value of `z[1][1]+z[2][1];`

- (i) ad
- (ii) df
- (iii) eg
- (iv) It gives an error
- (v) None of the above.

[5 Marks]

(c) Given `var k={a:[1,2,3],b:{c:[5],e:51},c:[3,2,1]};`,
what is the value of `k.b.c[0]+k.c.length`

- (i) undefined
- (ii) it gives an error
- (iii) 4
- (iv) 7
- (v) None of the above.

[5 Marks]

(d) Given `var z=/^[ac].i.*b$/;`,
which of the following is true:

- (i) `z.test("bob");`
- (ii) `z.test("aciiib");`
- (iii) `z.test("ccciib");`
- (iv) `z.test("aib");`
- (v) None of the above.

[5 Marks]

(e) The following code:

```
<HTML>
<HEAD>
</HEAD>
<BODY>
<p>
Result: <output type=text id="resultInt1" value="" readonly> </output>
</p>
<input onchange="
    var k=/^[0-9]+(|\.[0-9]+)$/;
    if (k.test(this.value))
        document.getElementById('resultInt1').value=parseFloat(this.value)+1;
    else {alert(this.value + ' is not a number '); this.value='';}
"
>
</BODY>
</HTML>
```

allows the user to input numbers with or without a decimal point and then adds one to the value if it is a legal number. Although, acceptable, this program allows the user to enter values with leading zeroes like 00123.5. We want to disallow such input. However, we do allow a single leading zero if it comes immediately before the decimal point as in 0.54 and also if the number is 0 itself.

Say which of the following regular expressions we must assign to `k` in order to correctly achieve this requirement:

- (i) `^([1-9][0-9]*|0)(|\.[0-9]+)$`
- (ii) `^([1-9]*|0)(|\.[0-9]+)$`
- (iii) `^([1-9][0-9]*|0)(\.[0-9]+)$`
- (iv) `^([1-9][0-9]*) (|\.[0-9]+)$`
- (v) None of the above.

[5 Marks]

QUESTION 2

(a) What is the output of the following Javascript code fragment:

```
var x='1';  
typeof(x);
```

- (i) "object"
- (ii) "number"
- (iii) "function"
- (iv) "string"
- (v) None of the above.

[5 Marks]

(b) Consider the following code:

```
<html>
<head>
<script type=text/javascript>

n=0;

function whichSound()
{
    document.getElementById(n).play();
    n=n+1;
}

function init()
{
    var btn = document.getElementById("run");
    btn.addEventListener("click",whichSound,false);
}
</script>
</head>
<body onload="init()">
<h1>Sound</h1>
<button id="run" type="button">Play</button>
<audio id="0" src="0.wav" preload="auto">
<audio id="1" src="1.wav" preload="auto">
<audio id="2" src="2.wav" preload="auto">
</body>
</html>
```

Each time the button is pressed (for the first three times) it plays a different sound. After that an error occurs. The problem is the line `n=n+1`; . If we change this line to `n=(n+2)%3`; , the program will:

- (i) Cycle repeatedly between the sounds in the order 0,2,1,0,2,1 etc.
- (ii) Cycle repeatedly between the sounds in the order 0,1,0,1,0,1 etc.
- (iii) Cycle repeatedly between the sounds in the order 0,2,0,2,0,2 etc.
- (iv) Cycle repeatedly between the sounds in the order 0,1,2,1,2,1,2 etc.
- (v) None of the above.

[5 Marks]

(c) Consider the following code:

```
<!DOCTYPE HTML>
<html>
  <head>
    <script>
      window.onload = function()
      {
        var canvas = document.getElementById("myCanvas");
        var context = canvas.getContext("2d");
        context.moveTo(100, 150);
        context.lineTo(450, 50);
        context.moveTo(450, 50);
        context.lineTo(450, 100);
        context.strokeStyle = "red";
        context.stroke();
        context.moveTo(450, 100);
        context.lineTo(650, 100);
        context.lineTo(100, 150);
        context.lineWidth = 15;
        context.stroke();
        context.strokeStyle = "green";
        context.lineTo(100, 400);
        context.stroke();
      };
    </script>
  </head>
  <body>
    <canvas id="myCanvas" width="578" height="400">
    </canvas>
  </body>
</html>
```

Which one of the following will be true:

- (i) There will be five red lines
- (ii) There will be at least one red line and at least one green line
- (iii) There will be six lines
- (iv) There will be five green lines
- (v) None of the above.

[5 Marks]

- (d) The following is an extract from the Google Maps Javascript API V3 Services Documentation:

You access the Google Maps API geocoding service within your code via the `google.maps.Geocoder` object. The `Geocoder.geocode()` method initiates a request to the geocoding service, passing it a `GeocodeRequest` object literal containing the input terms and a callback method to execute upon receipt of the response.

Consider the following code:

```
var geocoder; var map;
function initialize() {
    geocoder = new google.maps.Geocoder();
    var latlng = new google.maps.LatLng(-34.397, 150.644);
    var myOptions = {
        zoom: 15,
        center: latlng,
        mapTypeId: google.maps.MapTypeId.ROADMAP
    }
    map = new google.maps.Map(document.getElementById("map_canvas"), myOptions);
}

function codeAddress() {
    var address = "29 St James', SE14 6NW";
    geocoder.geocode( { 'address': address}, function(results, status) {
        if (status == google.maps.GeocoderStatus.OK) {
            map.setCenter(results[0].geometry.location);
            var marker = new google.maps.Marker({
                map: map,
                position: results[0].geometry.location
            });
        } else {
            alert("Geocode was not successful for the following reason: " + status);
        }
    });
}
```

What is the type of the `results` parameter of the callback function for `geocoder.geocode()`?

- (i) It is an object with a `location` field.
- (ii) It is an array of objects, the first of which has a `location` field.
- (iii) It is an array of objects, the first of which has a `geometry` field.
- (iv) It is an object with a `geometry` field.
- (v) None of the above.

[5 Marks]

(e) Consider the following code:

```
function randomWord()
{
var request=new XMLHttpRequest();
request.open("GET","words.dat",false);
request.send(null);
var x=request.responseText;
var wordArray=x.split("\n");
var rand=Math.floor(Math.random()*wordArray.length);
return wordArray[rand];
}
```

This code performs an HTTP request to the server and gets back the contents of a file `words.dat` which is a collection of Strings, one per line.

What is the type of variable `x`, above?

- (i) It is an array.
- (ii) It is a string.
- (iii) It is a number.
- (iv) It is an object.
- (v) None of the above.

[5 Marks]

QUESTION 3

(a) What is the output of the following Javascript code fragment:

```
var x=[1,2,3,4];  
typeof(x);
```

- (i) "object"
- (ii) "number"
- (iii) "function"
- (iv) "string"
- (v) None of the above.

[5 Marks]

(b) What is the final value of variable z in the following Javascript code fragment:

```
var words = "Cities of the Interior";  
var z=words.split(" ")[2];
```

- (i) 'i'
- (ii) 'of'
- (iii) 'the Interior'
- (iv) undefined
- (v) None of the above.

[5 Marks]

(c) What is the final value of variable z in the following Javascript code fragment:

```
var words = [1,2,3,4];  
words.push('cat');  
z=words[4][1];
```

- (i) 1
- (ii) 'cat'
- (iii) undefined
- (iv) 'a'
- (v) None of the above.

[5 Marks]

(d) What is the final value of variable `s` in the following Javascript code fragment:

```
var words = [1,2,3,4];  
var s='';  
for (var x in words) s=s+x;
```

- (i) '1234'
- (ii) '0123'
- (iii) undefined
- (iv) 10
- (v) None of the above.

[5 Marks]

(e) What is the final value of variable `x` in the following Javascript code fragment:

```
function dog(x,y){this.name=x;this.breed=y;}  
var x= (new dog('fido','mastiff')).name
```

- (i) 'name'
- (ii) 'mastiff'
- (iii) undefined
- (iv) 'dog'
- (v) None of the above.

[5 Marks]

QUESTION 4

(a) What is the output of the following Javascript code fragment:

```
var x=function{return 1;};  
typeof(x);
```

- (i) "object"
- (ii) "number"
- (iii) "function"
- (iv) "string"
- (v) None of the above.

[5 Marks]

Consider the following code:

```
<HTML>
<HEAD>
<SCRIPT type='text/javascript'>
function mousePress()
{
  alert(this.y);
}

var buttons=[];
function makeRowOfButtons(n,where)
{
  var wh=document.getElementById(where);
  for (var j=0;j<n;j++)
  {
    buttons[j]=document.createElement("BUTTON");
    buttons[j].y=j;
    var txt= document.createTextNode(String.fromCharCode("a".charCodeAt(0)+j));
    buttons[j].appendChild(txt);
    buttons[j].addEventListener("click",mousePress,false);
    wh.appendChild(buttons[j]);
  }
}
</SCRIPT>
</HEAD>
<BODY onload="...">
<FISH ID="fishy"></FISH>
</BODY>
</HTML>
```

(b) Which of the following when put after `onLoad=` will displays 26 buttons labelled 'a' to 'z' in the page.

- (i) `"makeRowOfButtons(26,mouspress())"`
- (ii) `"makeRowOfButtons(26,'fishy')"`
- (iii) `"makeRowOfButtons(26,'dishy')"`
- (iv) `"makeRowOfButtons(26)"`
- (v) None of the above.

[5 Marks]

(c) What happens when we click on the d button?

- (i) d is displayed
- (ii) e is displayed
- (iii) 4 is displayed
- (iv) nothing
- (v) None of the above.

[5 Marks]

(d) If we wanted our buttons to have upper case characters 'A'-'Z' we would have to change:
`document.createTextNode(String.fromCharCode("a".charCodeAt(0)+j));` to:

- (i) `document.createTextNode(String.fromCharCode("a".charCodeAt(26)+j));`
- (ii) `document.createTextNode(String.fromCharCode("a".charCodeAt(0)+j+26));`
- (iii) `document.createTextNode(String.fromCharCode("A".charCodeAt(0)+j));`
- (iv) `document.createTextNode(String.fromCharCode("A".charCodeAt(0)+26));`
- (v) None of the above.

[5 Marks]

(e) If we want to display the ascii value of each button when clicked we would have to replace the body of `mousepress` function above with

- (i) `alert(this.nodeValue.charCodeAt(0));`
- (ii) `alert(this.firstChild.nodeValue.charCodeAt(0)+26);`
- (iii) `alert(String.fromCharCode("A".charCodeAt(0)+26));`
- (iv) None of the above.
- (v) `alert(this.firstChild.nodeValue.charCodeAt(0));`

[5 Marks]

QUESTION 5

(a) What is the output of the following Javascript code fragment:

```
var x=1==2;  
typeof(x);
```

- (i) "object"
- (ii) "number"
- (iii) "function"
- (iv) "string"
- (v) None of the above.

[5 Marks]

(b) Given the following HTML code:

```
<HTML>  
<HEAD>  
</HEAD>  
<BODY>  
<FISH ID="FISHY"><DISHY>plate</DISHY><DISHY>cup</DISHY></FISH>  
</BODY>  
</HTML>
```

What is the output of the following Javascript code fragment:

```
document.getElementById('fishy').childNodes.length;
```

- (i) 1
- (ii) 2
- (iii) 3
- (iv) 0
- (v) None of the above.

[5 Marks]

(c) Given the following HTML code:

```
<HTML>
<HEAD>
</HEAD>
<BODY>
<FISH ID="fishy"><DISHY>plate</DISHY><DISHY>cup</DISHY></FISH>
</BODY>
</HTML>
```

What is the output of the following Javascript code fragment:

```
document.getElementById('fishy').childNodes[0].nodeName;
```

- (i) "DISHY"
- (ii) "FISHY"
- (iii) "plate"
- (iv) "cup"
- (v) None of the above.

[5 Marks]

(d) Given the following HTML code:

```
<HTML>
<HEAD>
</HEAD>
<BODY>
<FISH ID="FISHY"><DISHY>plate</DISHY><DISHY>cup</DISHY></FISH>
</BODY>
</HTML>
```

Which of the following would turn the colour of *cup* to red:

- (i) `document.getElementById('fishy').childNodes[1].style.color='red';`
- (ii) `document.getElementById('cup').style.color='red';`
- (iii) `document.getElementById('fishy').childNodes[0].color='red';`
- (iv) `document.getElementById('DISHY').childNodes[0].style.color='red';`
- (v) None of the above.

[5 Marks]

(e) Consider the following code:

```
<HEAD>
<script type=text/javascript>
var swap=0;
setInterval(function()
    {
        if (swap==0)
        {
            document.getElementById('fishy').src='black.jpeg';
            swap=1;
        }
        if (swap==1)
        {
            document.getElementById('fishy').src='red.jpeg';
            swap=0;
        }
    }
    ,5000);

</script>
</HEAD>
<BODY>
<IMG ID="fishy" src='black.jpeg'></IMG>
</BODY>
</HTML>
```

Which of the following is true:

- (i) If we watch for a few minutes we will see red more than black.
- (ii) If we watch for a few minutes we will see black more than red.
- (iii) It will alternate between red and black every five seconds.
- (iv) Red will be displayed first
- (v) None of the above.

[5 Marks]

IS51015A Answer Sheet

Tick at most one box from each row. If you mark more, your score for that row will be zero. Negative marking is in operation: You score five marks for each correct answer and lose 1.25 for each wrong answer. Remember, only your best three questions count.

Student Number:

	i	ii	iii	iv	v
1(a)					
1(b)					
1(c)					
1(d)					
1(e)					
2(a)					
2(b)					
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