**COMP3230/2022**

# UNIVERSITY OF KENT

## DIVISION OF COMPUTING, ENGINEERING AND MATHEMATICAL SCIENCES

## LEVEL 4 EXAMINATION

**Databases and the Web**

**MAY/JUNE 2022**

| **Paper Instructions** |
|---|
| The paper contains FOUR questions. Answer THREE questions. |
| **Notes to Candidates** |
| This is an open book examination to be completed and submitted within 24 hours. |
| This examination is designed to take **two hours** but you can take longer if you wish. Please ensure that you submit your answer booklet within 24 hours of the exam release time. |
| As you will have access to resources to complete your assessment, any content you use from external source materials should be cited. Full academic referencing is not required. |
| You are reminded of your responsibility to act with honesty, integrity and fairness in completing assessment requirements for your course, and to demonstrate good academic practice when undertaking this assessment. |
| This is an individual piece of work and collusion with others is strictly prohibited. |
| Plagiarism detection software will be in use. |
| Breaches of academic integrity will be considered to be academic misconduct. |
| Where the University believes that academic misconduct has taken place the University will investigate the case and apply academic penalties as published in Annex 10 of the Credit Framework. |

1. (a) Inspect the following HTML code.

```
Line 1   <html>
Line 2   <head>
Line 3   <title>First Attempt</title>
Line 4   <style>
Line 5   td th table { border: solid 1px }
Line 6   </style>
Line 7   </head>
Line 8   <body>
Line 9   <p style="colour:green">CO323 Coursework</p>
Line 10  <table>
Line 11  <tr><th>Question<th></th>Solution</th></tr>
Line 12  <tr><td>How    to    calculate    width?</td><td>Try
calc()</td></tr>
Line 13  </table>
Line 14   <caption>Notes</caption>
Line 15  </body>
Line 16  </html>
```

Identify four problems with the above code by stating the corresponding line number and show how you fix those errors.

[8 marks]

(b) Consider the following HTML with associated CSS:

```
<div id="container"><div id="inner"></div></div>
```

```
#container {
  width: 400px;
}
#inner {
  padding: 5px;
  margin: 2px;
  border: solid 1px grey;
  width: calc(50% - 4px);
}
```

What is the entire width of the `inner` element, in pixels? Show your calculation.

[4 marks]

(c) Provide the complete HTML and CSS code that produces the following table.

| | **A** | **B** |
|---|---|---|
| **C** | 1 | 2 |

[8 marks]

2. Inspect the following HTML code for displaying the marks of a student.

```
<html>
<head>
<title>Marks</title>
<script>
function calculateMarks() {}
</script>
</head>
<body onload="calculateMarks()">
<div id="marks">
<p><span>Module</span><span>CW1</span><span>%</span><span>CW2<
/span><span>%</span><span>Exam</span><span>%</span></p>
<p><span>Networks</span><span>60</span><span>25</span><span>80
</span><span>25</span><span>70</span><span>50</span></p>
<p><span>Programming</span><span>90</span><span>30</span><span
>90</span><span>30</span><span>60</span><span>40</span></p>
<p><span>AI</span><span>50</span><span>20</span><span>60</span
><span>30</span><span>80</span><span>50</span></p>
</div>
<table>
<tr><th>Module</th><th>Final Mark</th></tr>
<tr id="Programming"><th>Programming</th><td>?</td></tr>
<tr id="Networks"><th>Networks</th><td>?</td></tr>
<tr id="AI"><th>AI</th><td>?</td></tr>
</table>
</body>
</html>
```

Complete the JavaScript function `calculateMarks()` to calculate the final mark for each module, where two coursework marks and an exam mark are provided with their corresponding percentage weights. The function should then print the final marks onto the corresponding table cells (`?` within the `<td>` tags). The final mark of a module is the weighted average of the provided coursework and exam marks. Provide brief comments within the code to describe your solution. Note that your code should work for any number of modules displayed in this way (not only for the above three modules).

[20 marks]

3. (a) A PHP function is defined as follows:

```
function planets($arr) {
  if ($arr[1]) {
    print "Mercury";
  }
  else {
    for ($i=0; $i <= $arr[2]; $i++)
       {print $arr[3][$i];
       }
    }
    print count($arr);
  }
```

Recall that array `$arr` can be defined using a statement of the form:

```
$arr = array(…);
```

(i)

- Give an array `$arr` such that `planets($arr)` prints

```
Mercury
```

[2 marks]

- For this case, what is the output of the instruction

```
print count($arr);
```

[1 mark]

(ii)

- Give an array `$arr` such that `planets($arr)` prints

```
Venus
```

[2 marks]

- For this case, what is the output of the instruction

```
print count($arr);
```

[1 mark]

(iii)

- Give an array `$arr` such that `planets($arr)` prints

```
Earth Jupiter Saturn
```

Note: the for loop must do three iterations in case (iii).

[3 marks]

(iv)

- For this case, what is the output of the instruction

```
print count($arr);
```

[1 mark]

b) The following is the body of a web document titled `index.html`:

```
<h2>Write a city:</h2>
<form action="search.php" method="POST">
  <input type="text" city="cityName" />
  <input type="submit" value="Submit" />
</form>
```

(i) Create a drawing of what will appear on the web page when it is opened in a web browser.

[3 marks]

(ii) Describe what would happen after a user submits the form with the city name and write an example .

[2 marks]

(iii) Write a PHP statement in the document `search.php` to display the city submitted in (ii).

[3 marks]

(iv) Describe what would happen after a user submits the form with the city name if the method used is GET (replacing the POST method in `search.php` ) with an example

[2 marks]

4. A database is built in the library to catalogue books and handle book lending. Each book in the library is catalogued by author. Any number of books can be associated to an author. Each user is allowed to borrow one and only one book.

The database stores information about the following entities and their relationships:

- User: unique reference number, name, and phone number,
- Author: unique reference number, name
- Book: unique title, category (e.g. Physics, Science,..), publication year, the user (reference) borrowing the book, the author (reference) of the book.

a) Write SQL CREATE TABLE statements for these three tables. Justify your choices of keys used.

[8 marks]

b) Write SQL statements to perform the following tasks:

(i) Insert a new entry in the user table (for a set of values at your choice).

[3 marks]

(ii) List the title for all books with author "Stephen King".

[4 marks]

(iii) List the names of all the authors in the database, and beside each name give the number of books published on or after 2017

[5 marks]