

**CICT PART III SECTION 5**

**MOBILE APPLICATION DEVELOPMENT**

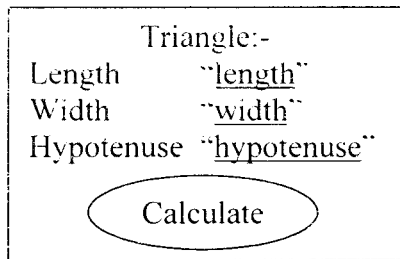
**THURSDAY: 30 November 2017.**

**Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question.**

**QUESTION ONE**

- (a) Describe two parts of a mobile subscriber number. (2 marks)
- (b) List two states of an application in a mobile phone. (2 marks)
- (c) Explain three location services provided by mobile telephony through mobile applications. (6 marks)
- (d) Consider the following user interface on a mobile phone:



The user inputs the length which is received by the program logic as "length" of type EditText, width which is received by the program logic as "width" of type EditText. When the hypotenuse is calculated it is shown on the EditText "hypotenuse".

If the length and width are not input, an error message is displayed on the screen.

The formula for calculating the hypotenuse is:

$$\text{Hypotenuse} = \sqrt{\text{Length}^2 + \text{Width}^2}$$

**Required:**

Write a program code segment that could achieve the above objective so as to run in an Android phone. (8 marks)

- (e) Enumerate two elements that must be addressed in a mobile device security policy. (2 marks)

**(Total: 20 marks)**

**QUESTION TWO**

- (a) Justify the choice of simulator over emulator as a testing tool in mobile application testing. (4 marks)

- (b) Mr. Mworira, a Nairobi resident wishes to develop an application to run on an iphone.

**Required:**

- (i) Describe the challenges he might encounter during this task. (2 marks)
- (ii) For each challenge identified in (b) (i) above, suggest a possible solution. (2 marks)
- (c) Write an Objective C program to calculate tax given the income based on the following rules:

Income	Tax rate
Below 30,000	20%
Above or equal to 30,000	30%

Ensure that the calculator should also show the net pay by subtracting tax from the income. (8 marks)

(d) Intents are the main mechanism for communication between components in an Android application.

Explain the following types of intent vulnerabilities as used in mobile application security:

(i) Intent interception.

(2 marks)

(ii) Intent spoofing.

(2 marks)

(Total: 20 marks)

### QUESTION THREE

(a) Describe “universal applications” as used in iOS mobile phones.

(2 marks)

(b) A local mobile provider used the prefix 07\*. They later adopted 07\*\*

Support the above move.

(2 marks)

(c) Many mobile applications are downloaded for free from different app stores, yet developers of these applications continue to develop them.

Citing their sources of income, support the move to continue producing applications.

(2 marks)

(d) A messaging software is required to send a maximum of 600 characters to a recipient. The recipient number is received by a variable “telno” which is of a type string. The country the message is being sent to is held by a variable “country” which is of a type string.

Upon typing the phone number the user chooses the country. A function “Ccode ( )” is used to return the country code given the country. The country code is then appended to the “telno” while removing the preceding zero.

If the message is equal to zero or greater than 600 in length, the user is prompted to recheck the message. Otherwise a function “Send ( );” runs.

The function “Ccode ( );” and “Send ( );” are provided and need not be re-written.

#### Required:

Write code segment to achieve the above task on an Android platform.

Do not write code for “Ccode ( );” and “Send ( );” functions, but you may call them.

(8 marks)

(e) Interpret the objective C source code below:

```
(i) - (int) max: (int) a SecondNumber: (int) b
{
    int result;
    if (a > b)
    {
        result = a ;
    }
    else
    {
        result = b ;
    }
    return result ;
}
```

(2 marks)

```
(ii) #import < Foundation/Foundation.h >
int main ( )
{
    for ( ; ; )
    {
        NSLog (@@ “Objective C.\n”);
    }
    return 0 ;
}
```

(2 marks)

```

(iii) #import <Foundation/Foundation.h>
      int main ( )
      {
        int a = 1 ;
        while a(< 6 )
        {
          NSLog (@@ "value of a :%d \n", a) ;
          a + + ;
        }
        return 0 ;
      }

```

(2 marks)

**(Total: 20 marks)**

#### QUESTION FOUR

(a) There are various variations of devices to consider when developing an iOS app.

**Required:**

- (i) List two main variations of these devices. (2 marks)
- (ii) Highlight four common built-in hardware components that come with the devices mentioned above. (4 marks)
- (b) Using an illustration, discuss the architecture of the iOS application technologies. (8 marks)
- (c) "Local Storage" and "session storage" are the two main objects used to store data in HTML5. Differentiate between "local storage" and "session storage". (2 marks)
- (d) Explain the following features of EditText widget as used in Android mobile application development:
  - (i) android : id = "@ + id/txtEmpName". (2 marks)
  - (ii) android : password = "false". (2 marks)

**(Total: 20 marks)**

#### QUESTION FIVE

(a) Illustrate how to embed style sheets in an HTML document with the left margin of the body and text being 20%, justified with a yellow background colour.

The paragraphs should be indented 2cm with the first heading coloured red. The title page of your browser should be "CSS in mobile devices". (6 marks)

- (b) Highlight two benefits of using component-based architectural design in mobile application development. (2 marks)
- (c) Write code in Android programming to perform the following tasks:
  - (i) Create a bundle object. (2 marks)
  - (ii) Put data in the created object of type integer. (2 marks)
- (d) Touch screens are vital components of smart phones. Touch screens recognise where on the screen you have placed your finger or stylus and communicate the co-ordinates to the CPU accordingly.

**Required:**

Explain two popular types of touch screens. (4 marks)

(e) Write code snippet that uses "Simple Cursor Adaptor" to perform a query in "androids intents" and returns a cursor that contains a row for each person and column for the names and phone numbers in a "contacts database". (4 marks)

**(Total: 20 marks)**

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