THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

136/2 **COMPUTER SCIENCE 2**

(For Both School and Private Candidates)

Time : 3 Hours **ANSWERS** **Year : 2019**

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **two (2)** questions including question number **one (1)**.
3. Communication devices and any unauthorised materials are **not** allowed in the examination room.
4. Write your **Examination Number** on every page of your answer booklet(s).

Question 1 (a)

Construct a C++ program that will convert the lengths entered by a user to centimeters. The program should prompt a user to enter two integer values, the first value for feet and the second value for inches. The program should display the numbers entered by the user, total number of inches and total centimeters. Use suitable messages to display the output.

Solution:

```
#include <iostream>

using namespace std;



int main() {

    int feet, inches, totalInches;

    double centimeters;



    // Prompt the user for input

    cout << "Enter length in feet: ";

    cin >> feet;

    cout << "Enter length in inches: ";

    cin >> inches;



    // Convert feet to inches and add remaining inches
```

```
    totalInches = (feet * 12) + inches;

    // Convert inches to centimeters
    centimeters = totalInches * 2.54;

    // Display results
    cout << "\nYou entered: " << feet << " feet and " << inches << " inches." << endl;
    cout << "Total length in inches = " << totalInches << " inches." << endl;
    cout << "Total length in centimeters = " << centimeters << " cm." << endl;

    return 0;
}
```

Explanation:

- 1 foot = 12 inches
- 1 inch = 2.54 cm
- The program first converts feet into inches, adds them with user-provided inches, then multiplies by 2.54 to get centimeters.
- It displays all results with clear messages.

Question 1 (b)

Use switch…case statement and while loop to construct a C++ program that reads the letter codes A to Z and prints the corresponding telephone digits. A program should stop when a user keys symbol #. The letter codes and their corresponding telephone digits are given in Table 1.

Table 1 (Telephone keypad mapping):

ABC → 2

DEF → 3

GHI → 4

JKL → 5

MNO → 6

PQRS → 7

TUV → 8

WXYZ → 9

Solution:

```
#include <iostream>

using namespace std;



int main() {

   char ch;
```

```
cout << "Enter letters A-Z to get telephone digits (enter # to stop): " << endl;



while (true) {

   cin >> ch;



   if (ch == '#') {

      cout << "Program terminated." << endl;

      break;

   }



   // Convert lowercase to uppercase

   if (ch >= 'a' && ch <= 'z')

      ch = ch - 'a' + 'A';



   switch (ch) {

      case 'A': case 'B': case 'C':

         cout << "Digit: 2" << endl;

         break;
```

```
case 'D': case 'E': case 'F':
    cout << "Digit: 3" << endl;
    break;
case 'G': case 'H': case 'I':
    cout << "Digit: 4" << endl;
    break;
case 'J': case 'K': case 'L':
    cout << "Digit: 5" << endl;
    break;
case 'M': case 'N': case 'O':
    cout << "Digit: 6" << endl;
    break;
case 'P': case 'Q': case 'R': case 'S':
    cout << "Digit: 7" << endl;
    break;
case 'T': case 'U': case 'V':
    cout << "Digit: 8" << endl;
    break;
```

```
            case 'W': case 'X': case 'Y': case 'Z':
                cout << "Digit: 9" << endl;
                break;
            default:
                cout << "Invalid input, enter A-Z or # to quit." << endl;
        }
    }
    return 0;
}
```

Explanation:

- The program continuously reads a character from the user.
- If the user enters #, it terminates.
- It uses switch…case to map letters A–Z into their respective telephone digits.
- Both uppercase and lowercase letters are accepted.

Question 2 (a) (i)

Use Visual Basic program, design and activate the following alarm clock interface:

Interface requirements:

- The time interval for the clock should be 1 second.
- The font type and size of the time displayed should be **Courier New, size 48**.
- The "Alarm On" or "Alarm Off" message should be displayed in **MS Sans Serif, size 18, Bold**.

Solution (Design):

- Add a **Timer** control (Timer1) to the form, set its Interval = 1000 (1 second).
- Add a **Label** (lblTime) to display the current time. Set Font = Courier New, Size = 48.
- Add two **OptionButtons** or **RadioButtons** (optAlarmOn and optAlarmOff) for selecting alarm state. Set their Font = MS Sans Serif, Size = 18, Bold.
- Add a **Label** (lblStatus) to display "Alarm On" or "Alarm Off".

Question 2 (a) (ii)

Write Visual Basic codes to activate the interface created above.

```
Private Sub Form_Load()

    Timer1.Interval = 1000    ' 1 second

    Timer1.Enabled = True

    lblStatus.Caption = "Alarm Off"

    lblTime.Caption = Time
```

```
End Sub


Private Sub Timer1_Timer()
    lblTime.Caption = Time   ' Update time every second
    If optAlarmOn.Value = True Then
        lblStatus.Caption = "Alarm On"
        ' Example: Alarm set for 7:00 AM
        If Time = "07:00:00" Then
            Beep
        End If
    Else
        lblStatus.Caption = "Alarm Off"
    End If
End Sub


Private Sub optAlarmOn_Click()
    lblStatus.Caption = "Alarm On"
End Sub
```

```
Private Sub optAlarmOff_Click()

    lblStatus.Caption = "Alarm Off"

End Sub
```

Explanation:

- The program displays the current system time in real-time.
- If **Alarm On** is selected, the label shows “Alarm On” and checks whether the current time matches the alarm time. If it does, a beep sound is played.
- If **Alarm Off** is selected, the alarm stops.

Question 2 (a) (iii)

Save the project as **Vb Alarm**.

Question 2 (b) (i)

Use Visual Basic program to create the following **Calendar Viewer Interface**.

Design requirements:

- Add a **MonthView control** (from Microsoft Windows Common Controls).
- Add a **TextBox** (txtDate) to display the selected date.

Question 2 (b) (ii)

Write Visual Basic codes which will display the date picked by the user in the format **MM/DD/YYYY**.

```
Private Sub MonthView1_DateClick(ByVal DateClicked As Date)
    txtDate.Text = Format(DateClicked, "MM/DD/YYYY")
End Sub
```

Explanation:

- When the user clicks a date in the calendar, the program automatically displays it in the text box.
- The format MM/DD/YYYY ensures uniform display (e.g., 04/21/2019).

Alright, let's solve **Computer Science 2 – 2019, Question 3** step by step.

Question 3 (a)

Use HTML frame codes and basic HTML tags to create a given web page with the specified page descriptions.

Solution (Example HTML with Frameset):

```
<!DOCTYPE html>
<html>
<head>
    <title>Sample Frame Page</title>
</head>
<frameset cols="25%,75%">
    <frame src="menu.html" name="menuFrame">
```

```
    <frame src="content.html" name="contentFrame">
</frameset>
</html>
```

menu.html (left frame content):

```
<!DOCTYPE html>
<html>
<head><title>Menu</title></head>
<body>
    <h3>Navigation</h3>
    <ul>
        <li><a href="home.html" target="contentFrame">Home</a></li>
        <li><a href="about.html" target="contentFrame">About</a></li>
        <li><a href="contact.html" target="contentFrame">Contact</a></li>
    </ul>
</body>
</html>
```

content.html (right frame content):

```
<!DOCTYPE html>
```

```
<html>

<head><title>Content</title></head>

<body>

  <h2>Welcome to the Content Section</h2>

  <p>This is where the selected page will be displayed.</p>

</body>

</html>
```

Explanation:

- The frameset divides the browser window into two parts: left (menu) and right (content).
- Links in the left frame open inside the right frame.
- This demonstrates HTML frames with basic tags.

Question 3 (b)

Create a form which would enable a user to calculate the Maximum, Minimum and both Maximum and Minimum using JavaScript and HTML codes for three entered Numbers. Also, a user should provide a **Reset button** option so as to clear the data entered.

Solution (HTML + JavaScript Form):

```
<!DOCTYPE html>

<html>

<head>
```

```
<title>Max Min Calculator</title>

<script>

    function calculate(choice) {

        var n1 = parseFloat(document.getElementById("num1").value);

        var n2 = parseFloat(document.getElementById("num2").value);

        var n3 = parseFloat(document.getElementById("num3").value);



        if (isNaN(n1) || isNaN(n2) || isNaN(n3)) {

            alert("Please enter all three numbers.");

            return;

        }



        var nums = [n1, n2, n3];

        var max = Math.max.apply(null, nums);

        var min = Math.min.apply(null, nums);



        if (choice === "max") {

            alert("Maximum number is: " + max);
```

```
        } else if (choice === "min") {
            alert("Minimum number is: " + min);
        } else if (choice === "both") {
            alert("Maximum number is: " + max + "\nMinimum number is: " + min);
        }
    }

    function resetForm() {
        document.getElementById("calcForm").reset();
    }
  </script>
</head>
<body>
  <h2>Maximum and Minimum Calculator</h2>
  <form id="calcForm">
    Enter Number 1: <input type="text" id="num1"><br><br>
    Enter Number 2: <input type="text" id="num2"><br><br>
    Enter Number 3: <input type="text" id="num3"><br><br>
```

```
        <input type="button" value="Find Maximum" onclick="calculate('max')">
        <input type="button" value="Find Minimum" onclick="calculate('min')">
        <input type="button" value="Find Both" onclick="calculate('both')">
        <input type="button" value="Reset" onclick="resetForm()">
    </form>
</body>
</html>
```

Explanation:

- The form takes three numbers from the user.
- JavaScript functions calculate the maximum, minimum, or both using Math.max() and Math.min().
- Results are displayed using alert boxes.
- The Reset button clears all inputs instantly.