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: 2021**

Instructions:

1. this paper consists of three questions.
2. Answer two questions including question number one
3. Submit printed codes and screenshots together with the softcopy of your work(s)

1. (a) Construct a C++ program to generate the pattern given in the following screenshot:

The desired pattern is:

```
    1
   12
  123
 1234
12345
```

HINT: (A user should enter any number which is less than 11 to generate a pattern).

Solution:

```
#include <iostream>
using namespace std;
int main() {
   int n;

   cout << "Enter a number to generate a pattern (less than 11): ";
   cin >> n;

   if (n < 1 || n > 10) {
      cout << "Please enter a number between 1 and 10." << endl;
      return 1;
   }

   for (int i = 1; i <= n; i++) {
      for (int j = 1; j <= n - i; j++) {
         cout << " ";
      }
      for (int k = 1; k <= i; k++) {
         cout << k;
      }
      cout << endl;
   }

   return 0;
}
```

(b) Construct a C++ program that finds the sum of the first `n` positive integers. The program should prompt a user to enter the number of terms to be added.

Solution:

```
#include <iostream>
using namespace std;

int main() {
   int n, sum = 0;

   cout << "Enter the number of terms to add: ";
   cin >> n;

   if (n < 1) {
      cout << "Please enter a positive number." << endl;
      return 1;
   }

   for (int i = 1; i <= n; i++) {
      sum += i;
   }

   cout << "The sum of the first " << n << " positive integers is: " << sum << endl;

   return 0;
}
```

2. (a) Use basic HTML and JavaScript codes to design a phonebook which will enable a user to submit the name and the telephone number. The entries should be displayed in the text area after clicking a command button "Submit" and disappear when a user clicks a command button "Clear".

Phonebook description:
- Font size and color of the heading "Current Person" should be h3 and green respectively.
- Font size and color of the word "Phonebook" should be 15 and red respectively.
- Background color of the body should be pink.
- The width and height of the text area must be 15 and 70 respectively.

Solution:

```
<!DOCTYPE html>
<html>
<head>
   <title>Phonebook</title>
```

```
  <style>
    body {
      background-color: pink;
      font-family: Arial, sans-serif;
    }
    h3 {
      color: green;
    }
    #phonebook-title {
      font-size: 15px;
      color: red;
    }
    textarea {
      width: 200px;
      height: 70px;
    }
  </style>
  <script>
    function submitEntry() {
      let name = document.getElementById("name").value;
      let phone = document.getElementById("phone").value;
      if (name && phone) {
        document.getElementById("phonebook").value += `${name} - ${phone}\n`;
      }
    }

    function clearEntries() {
      document.getElementById("phonebook").value = "";
    }
  </script>
</head>
<body>
  <h3>Current Person</h3>
  Name: <input type="text" id="name"><br><br>
  Phone Number: <input type="text" id="phone"><br><br>
  <button onclick="submitEntry()">Submit</button>
  <button onclick="clearEntries()">Clear</button>
  <h3 id="phonebook-title">Phonebook:</h3>
  <textarea id="phonebook" readonly></textarea>
</body>
</html>
```

2. (b) Use basic HTML and JavaScript codes to design a picture gallery which can enable a user to magnify a picture after clicking the desired picture. The gallery should display a message "Click a Picture" after clicking a command button "Click Me to Magnify".

Gallery description:
- The width and height of each picture should be 170px and 150px respectively.
- The table border should be 1.

Solution:

```
<!DOCTYPE html>
<html>
<head>
   <title>Picture Gallery</title>
   <style>
      table {
         border: 1px solid black;
         margin: auto;
      }
      img {
         width: 170px;
         height: 150px;
         cursor: pointer;
      }
   </style>
   <script>
      function magnify(imgSrc) {
         alert("Click a Picture");
         window.open(imgSrc, "_blank", "width=600,height=400");
      }
   </script>
</head>
<body>
   <h1 align="center">Picture Gallery</h1>
   <table>
      <tr>
         <td><img src="image1.jpg" alt="Image 1" onclick="magnify('image1.jpg')"></td>
         <td><img src="image2.jpg" alt="Image 2" onclick="magnify('image2.jpg')"></td>
      </tr>
      <tr>
         <td><img src="image3.jpg" alt="Image 3" onclick="magnify('image3.jpg')"></td>
         <td><img src="image4.jpg" alt="Image 4" onclick="magnify('image4.jpg')"></td>
      </tr>
```

```
    </table>
    <button onclick="alert('Click a Picture')">Click Me to Magnify</button>
</body>
</html>
```

3. (a) Use Visual Basic program to design the following "Students Examination Result Processing" interface.

Interface Description:
- The height and width of the form must be 6690 and 10185 respectively.
- The option buttons for combinations should be in the form of a control array with the name "Comb" and index 0, 1, and 2 respectively.
- The width and height of the ListBox control named `List1` is 7455 and 2010 respectively.
- PCM stands for Physics, Chemistry, and Advanced Mathematics.
- PCB stands for Physics, Chemistry, and Biology.
- HGL stands for History, Geography, and Language.

(i) Add six TextBox controls to the interface named `P1`, `P2`, `P3`, `P4`, `Text2`, and `Text3`. Change the visible property for these controls to `False` so that they are hidden when the program runs.

(ii) Add a label having an empty caption to the interface just below the horizontal line and name it `Label4`. Change the height and width properties of `Label4` to 375 and 8295 respectively.

Solution for Interface Creation:

1. Create a form with the following controls:
   - TextBoxes: `P1`, `P2`, `P3`, `P4`, `Text2`, `Text3` (set `Visible` property to `False`).
   - Option buttons: A control array named `Comb` with indexes `0`, `1`, and `2`.
   - ListBox: `List1` with the width and height set to `7455` and `2010`.
   - Label: `Label4` with empty caption and width and height set to `375` and `8295`.

2. Add buttons:
   - `cmdShowResults`: Caption "Show Results".
   - `cmdRemarks`: Caption "Remarks".
   - `cmdExit`: Caption "Exit".
   - `cmdClear`: Caption "Clear".

3. (b) Use Visual Basic codes to activate the interface created in part (a) in order to perform the following tasks:

(i) Prompt a user to enter marks for each subject in a selected combination. The General Studies subject is compulsory for all students. The combination options should be stored in the textboxes named `Text2` as PCM, PCB, or HGL, and the entered marks should be stored in the textboxes `P1`, `P2`, `P3`, and `P4`.

(ii) Display on `Label4` caption a message "Results for Examination Number, Student Name and Combination." where `Examination Number`, `Student Name`, and `Combination` are the inputs entered by the user.

(iii) Find the average of the marks stored in textboxes `P1`, `P2`, `P3`, and `P4` and store it in a textbox named `Text3`.

(iv) Display in `List1` the subject name with their respective marks entered and the average marks when a user clicks the command button "Show Results".

(v) Give a message "Congratulations! You have passed to join the University" if the average is greater or equal to 40%. Otherwise, it should give a message "Sorry your average is less than 40! Please re-sit the exam" when a command button "Remarks" is clicked.

(vi) Exit the program when a user clicks an "Exit" button.

(vii) Clear all the visible inputs and the outputs when a user clicks a "Clear" button.

Solution for Code:

```
Private Sub cmdShowResults_Click()
   ' Display subject marks and average
   List1.Clear
   List1.AddItem "Subject 1: " & P1.Text
   List1.AddItem "Subject 2: " & P2.Text
   List1.AddItem "Subject 3: " & P3.Text
   List1.AddItem "Subject 4: " & P4.Text
   List1.AddItem "Average: " & Text3.Text
End Sub

Private Sub cmdRemarks_Click()
   ' Display remarks based on average
   If Val(Text3.Text) >= 40 Then
      MsgBox "Congratulations! You have passed to join the University."
   Else
      MsgBox "Sorry your average is less than 40! Please re-sit the exam."
   End If
End Sub

Private Sub cmdExit_Click()
   ' Exit the application
   Unload Me
End Sub
```

```
Private Sub cmdClear_Click()
   ' Clear all inputs and outputs
   P1.Text = ""
   P2.Text = ""
   P3.Text = ""
   P4.Text = ""
   Text3.Text = ""
   Label4.Caption = ""
   List1.Clear
End Sub

Private Sub Comb_Click(Index As Integer)
   ' Set the combination and prompt for marks
   Select Case Index
      Case 0
         Text2.Text = "PCM"
      Case 1
         Text2.Text = "PCB"
      Case 2
         Text2.Text = "HGL"
   End Select
   Label4.Caption = "Results for Examination Number, Student Name and Combination: " & Text2.Text
   P1.Text = InputBox("Enter marks for Subject 1:")
   P2.Text = InputBox("Enter marks for Subject 2:")
   P3.Text = InputBox("Enter marks for Subject 3:")
   P4.Text = InputBox("Enter marks for General Studies:")
   Text3.Text = (Val(P1.Text) + Val(P2.Text) + Val(P3.Text) + Val(P4.Text)) / 4
End Sub
```