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: 2012**

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. By using C++ programming, develop a program that will find a factorial of a number.

Solution:
The factorial of a number n is the product of all positive integers less than or equal to n. The formula is given as:
n! = n x (n-1) x (n-2) x ... x 1
C++ program:

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

int main() {
   int n, factorial = 1;

   cout << "Enter a positive integer: ";
   cin >> n;

   if (n < 0)
      cout << "Factorial of a negative number doesn't exist.";
   else {
      for (int i = 1; i <= n; ++i) {
         factorial *= i;
      }
      cout << "Factorial of " << n << " = " << factorial;
   }
   return 0;
}
```

1(b) Write a C++ program by using switch-case statement that will:
(i) Prompt the user to enter options as follows:
1. Choose even numbers.
2. Choose odd numbers.
3. Choose prime numbers.

(ii) Allow the user to select the highest value of the selected type and then the program will display the number found within the range.

Solution:

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

bool isPrime(int num) {
   if (num <= 1) return false;
   for (int i = 2; i <= num / 2; ++i) {
      if (num % i == 0) return false;
```

```
    }
    return true;
}

int main() {
    int option, range;
    cout << "Enter the range: ";
    cin >> range;
    cout << "Select an option:\n";
    cout << "1. Choose even numbers\n";
    cout << "2. Choose odd numbers\n";
    cout << "3. Choose prime numbers\n";
    cout << "Enter your choice: ";
    cin >> option;

    int maxNumber = -1;

    switch (option) {
        case 1:
            for (int i = 2; i <= range; i += 2) {
                maxNumber = i;
            }
            cout << "Highest even number: " << maxNumber;
            break;

        case 2:
            for (int i = 1; i <= range; i += 2) {
                maxNumber = i;
            }
            cout << "Highest odd number: " << maxNumber;
            break;

        case 3:
            for (int i = 2; i <= range; ++i) {
                if (isPrime(i)) maxNumber = i;
            }
            cout << "Highest prime number: " << maxNumber;
            break;

        default:
            cout << "Invalid option!";
            break;
    }
```

```
    return 0;
}
```

2. (a) Use Visual Basic code to develop a program that will solve the roots of a quadratic equation x_1 and x_2 by entering coefficients of the equation a, b, and c.

Solution:

```
Private Sub cmdSolve_Click()
    Dim a As Double, b As Double, c As Double
    Dim discriminant As Double, x1 As Double, x2 As Double

    a = Val(txtA.Text)
    b = Val(txtB.Text)
    c = Val(txtC.Text)

    discriminant = b * b - 4 * a * c

    If discriminant > 0 Then
        x1 = (-b + Sqr(discriminant)) / (2 * a)
        x2 = (-b - Sqr(discriminant)) / (2 * a)
        lblRemark.Caption = "The roots are real and distinct."
    ElseIf discriminant = 0 Then
        x1 = -b / (2 * a)
        x2 = x1
        lblRemark.Caption = "The roots are real and identical."
    Else
        x1 = -b / (2 * a)
        x2 = Sqr(-discriminant) / (2 * a)
        lblRemark.Caption = "The roots are complex."
    End If

    txtX1.Text = x1
    txtX2.Text = x2
End Sub

Private Sub cmdClear_Click()
    txtA.Text = ""
    txtB.Text = ""
    txtC.Text = ""
    txtX1.Text = ""
```

```
    txtX2.Text = ""
    lblRemark.Caption = ""
End Sub

Private Sub cmdExit_Click()
    Unload Me
End Sub
```

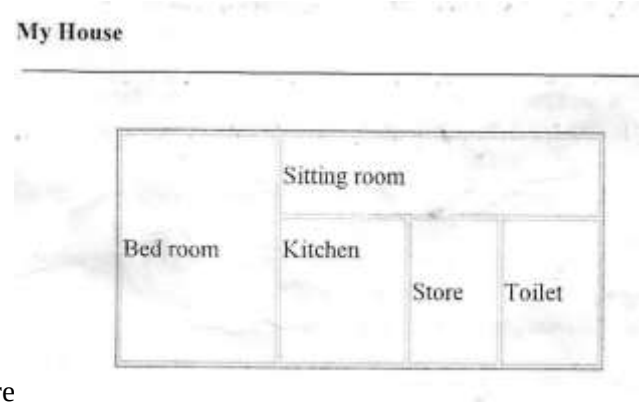
2(b) By using Visual Basic codes, develop a form that will allow the teacher to enter students' records i.e., Name, Marks, and Class to a Microsoft Access Table called "Student" after clicking a command button "Submit."

Solution:

```
Private Sub cmdSubmit_Click()
    Dim conn As New ADODB.Connection
    Dim rs As New ADODB.Recordset
    Dim sql As String

    conn.ConnectionString = "Provider=Microsoft.ACE.OLEDB.12.0;Data Source=YourDatabasePath\Student.accdb;"
    conn.Open

    sql = "INSERT INTO Student (Name, Marks, Class) VALUES ('" & txtName.Text & "', " & Val(txtMarks.Text) & ", '" & txtClass.Text & "')"
    conn.Execute sql

    MsgBox "Record submitted successfully!"

    conn.Close
End Sub

Private Sub cmdClear_Click()
    txtName.Text = ""
    txtMarks.Text = ""
    txtClass.Text = ""
End Sub

Private Sub cmdExit_Click()
    Unload Me
End Sub
```

3. (a) By using HTML codes, design a house plan as indicated below.

Page Specification
(i) Use heading level one (h1) to write the heading "My House".
(ii) Draw horizontal line to separate the heading and the plan.
(iii) Use green colour as a background for the bedroom. The font colour of the word "Bed room" should be red.
(iv) The sitting room should have a brown background. The font colour of the word "sitting room" should be white.
(v) Put purple colour background for the Kitchen. The font colour of the word "Kitchen" should be black.
(vi) The background colour for Store should be yellow. The font colour of the word "Store" should be black.
(vii) The background colour for toilet should be red with font colour black.
(viii) Take table width as 300, height as 150 and border width=1.
(ix) Your page title is "My first page".



(x) Also table should be centre

Solution:

```
<!DOCTYPE html>
<html>
<head>
   <title>My First Page</title>
   <style>
      body {
         text-align: center;
      }
      table {
         width: 300px;
         height: 150px;
         border: 1px solid black;
         margin: 0 auto;
      }
      th, td {
```

```
            text-align: center;
            vertical-align: middle;
        }
        .bedroom {
            background-color: green;
            color: red;
        }
        .sitting-room {
            background-color: brown;
            color: white;
        }
        .kitchen {
            background-color: purple;
            color: black;
        }
        .store {
            background-color: yellow;
            color: black;
        }
        .toilet {
            background-color: red;
            color: black;
        }
    </style>
</head>
<body>
    <h1>My House</h1>
    <hr>
    <table>
        <tr>
            <td class="bedroom">Bed room</td>
            <td class="sitting-room" colspan="2">Sitting room</td>
        </tr>
        <tr>
            <td class="kitchen">Kitchen</td>
            <td class="store">Store</td>
            <td class="toilet">Toilet</td>
        </tr>
    </table>
</body>
</html>
```

(b) Prepare JavaScript codes with one prompt box called multiple table which will prompt the user to:

(i) Enter a number to generate multiples.
(ii) Enter the highest value to set the limit for the multiples.
(iii) Display the multiples of the selected number.

Solution:

```
<!DOCTYPE html>
<html>
<head>
   <title>Multiplication Table</title>
</head>
<body>
   <script>
      function generateMultiples() {
         let number = parseInt(prompt("Enter a number to generate multiples:"));
         let limit = parseInt(prompt("Enter the highest value to set the limit for the multiples:"));
         let result = "Multiples of " + number + " up to " + limit + ":\n";

         for (let i = 1; i * number <= limit; i++) {
            result += (i * number) + "\n";
         }

         alert(result);
      }

      generateMultiples();
   </script>
</body>
</html>
```