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 : 2014**

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).

1(a) Write a C++ program that prompts the user to select either Arithmetic Progression (AP) or Geometric Progression (GP) to generate and display the sum of terms. The program should request the user to enter first term, number of terms, common ratio or common difference depending on the user's selection.

Solution:

```
#include <iostream>

#include <cmath>

using namespace std;



int main() {

    int choice, n;

    double a, d, r, sum;



    cout << "Select Progression Type:\n";

    cout << "1. Arithmetic Progression (AP)\n";

    cout << "2. Geometric Progression (GP)\n";

    cout << "Enter your choice: ";

    cin >> choice;



    cout << "Enter first term (a): ";
```

```
cin >> a;

cout << "Enter number of terms (n): ";

cin >> n;



if(choice == 1) {

    cout << "Enter common difference (d): ";

    cin >> d;

    sum = (n / 2.0) * (2 * a + (n - 1) * d);

    cout << "The sum of " << n << " terms of AP = " << sum << endl;

}

else if(choice == 2) {

    cout << "Enter common ratio (r): ";

    cin >> r;

    if(r == 1) {

        sum = a * n;

    } else {

        sum = a * (pow(r, n) - 1) / (r - 1);

    }
```

```
        cout << "The sum of " << n << " terms of GP = " << sum << endl;
    }
    else {
        cout << "Invalid choice!" << endl;
    }
    return 0;
}
```

Explanation:

- For AP, the formula is $S = n/2 \times (2a + (n-1)d)$.
- For GP, the formula is $S = a \times (r^n - 1)/(r - 1)$ when $r \neq 1$, and $S = a \times n$ when $r = 1$.
- The program allows user choice and calculates accordingly.

1(b) Create a C++ program which prompts the user to enter 20 numbers and the program should count and print the number of zero, odd and even numbers entered.

Solution:

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

int main() {
```

```
int num, zeros = 0, odds = 0, evens = 0;



cout << "Enter 20 numbers:" << endl;

for(int i = 1; i <= 20; i++) {

   cout << "Number " << i << ": ";

   cin >> num;



   if(num == 0) {

      zeros++;

   }

   else if(num % 2 == 0) {

      evens++;

   }

   else {

      odds++;

   }

}
```

```
    cout << "\nResults:" << endl;

    cout << "Zeros: " << zeros << endl;

    cout << "Even numbers: " << evens << endl;

    cout << "Odd numbers: " << odds << endl;



    return 0;

}
```

Explanation:

- A loop runs 20 times to accept input numbers.
- If the number is zero, it is counted separately.
- If divisible by 2, it is even, otherwise odd.
- At the end, totals for zeros, evens, and odds are displayed.

2. Create an interface which is used to perform a selection game. The interface should display a message through a message box if topic/topics is/are selected and should display "YOU HAVE NO HOBBY" when no topic is selected. Create a table in the database using Microsoft Access, and use Visual Basic program to create a user interface which will display the database created as an icon.

Solution:

(a) **Visual Basic Interface (Selection Game):**

```
Private Sub Command1_Click()

    Dim message As String
```

```
    message = ""

    If Check1.Value = 1 Then
        message = message & "Football Selected" & vbCrLf
    End If
    If Check2.Value = 1 Then
        message = message & "Music Selected" & vbCrLf
    End If
    If Check3.Value = 1 Then
        message = message & "Reading Selected" & vbCrLf
    End If

    If message = "" Then
        MsgBox "YOU HAVE NO HOBBY", vbExclamation
    Else
        MsgBox message, vbInformation
    End If
End Sub
```

Explanation:

- Several checkboxes (Check1, Check2, Check3) represent hobbies.
- When the user clicks a button, the program checks selected hobbies and displays them.
- If none are selected, it shows "YOU HAVE NO HOBBY".

(b) **Microsoft Access Table:**

- Create a table named *Hobbies* with fields: ID (AutoNumber), Name (Text), Hobby (Text).
- Enter sample data (e.g., John – Football, Mary – Reading).

(c) **Display database in VB as icon:**

- Use ADO Data Control or DAO and connect to the Access database.
- On the VB Form, use an *Image Control* to represent the database icon.
- Clicking the icon can open the database table in a bound DataGrid.

3. (a) Use HTML codes to create a given webpage with the specified page descriptions.

Solution (HTML page):

```
<!DOCTYPE html>
<html>
<head>
  <title>My Webpage</title>
```

```
</head>
<body bgcolor="lightblue">
    <h1>Welcome to My Webpage</h1>
    <p>This is a simple page designed with HTML.</p>
    <p style="color:green;">This text is displayed in green color.</p>
</body>
</html>
```

Explanation:

- Background color set with bgcolor.
- Heading with <h1>.
- Text color controlled by inline CSS.

3. (b) Create a simple watch by using JavaScript and HTML codes which can help the user to check for the current date and time after clicking button "Date". Additionally, the user should use it as a stopwatch after clicking the button "Stop watch".

Solution (HTML + JavaScript):

```
<!DOCTYPE html>
<html>
<head>
    <title>JavaScript Watch</title>
```

```
<script type="text/javascript">
    function showDateTime() {
        var now = new Date();
        document.getElementById("display").innerHTML = now;
    }

    var start, timer;
    function startStopwatch() {
        start = new Date().getTime();
        timer = setInterval(function(){
            var now = new Date().getTime();
            var elapsed = Math.floor((now - start) / 1000);
            document.getElementById("display").innerHTML = "Stopwatch: " + elapsed + " seconds";
        }, 1000);
    }

    function stopStopwatch() {
        clearInterval(timer);
```

```
        }
    </script>
</head>
<body>
    <h1>Simple Watch</h1>
    <div id="display">Click a button</div>
    <br>
    <button onclick="showDateTime()">Date</button>
    <button onclick="startStopwatch()">Stop watch</button>
    <button onclick="stopStopwatch()">Stop</button>
</body>
</html>
```

Explanation:

- showDateTime() displays the current system date and time.
- startStopwatch() starts counting seconds from when the button is pressed.
- stopStopwatch() stops the counter.