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 : 2020**

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).

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1. (a) Use an “Array” and “For loop” to create a C++ program which prompts a user to enter marks of five subjects for three students. The program should display the total marks, average and grade for each student as well as overall average marks. Use the grading system given in table 1 to assign average grades.

Solution for (a)

```
#include <iostream>

using namespace std;

char getGrade(float avg) {

    if (avg >= 75 && avg <= 100) return 'A';

    else if (avg >= 65) return 'B';

    else if (avg >= 55) return 'C';

    else if (avg >= 45) return 'D';

    else if (avg >= 35) return 'S';

    else return 'F';

}



int main() {

    const int students = 3;

    const int subjects = 5;
```


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```
int marks[students][subjects];

float total[students], average[students];

float overallTotal = 0, overallAverage;

// Input marks

for (int i = 0; i < students; i++) {

    total[i] = 0;

    cout << "Enter marks of 5 subjects for Student " << i + 1 << ":" << endl;

    for (int j = 0; j < subjects; j++) {

        cin >> marks[i][j];

        total[i] += marks[i][j];

    }

    average[i] = total[i] / subjects;

    overallTotal += average[i];

}

// Display results

for (int i = 0; i < students; i++) {

    cout << "\nStudent " << i + 1 << " Results:" << endl;

    cout << "Total Marks = " << total[i] << endl;
```


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```
        cout << "Average Marks = " << average[i] << endl;

        cout << "Grade = " << getGrade(average[i]) << endl;

    }

    overallAverage = overallTotal / students;

    cout << "\nOverall Class Average Marks = " << overallAverage << endl;

    cout << "Overall Grade = " << getGrade(overallAverage) << endl;



    return 0;

}
```

Explanation

- An array marks[students][subjects] stores all marks.
- Nested loops allow entering 5 subject marks per student.
- The getGrade function returns the grade based on the table provided.
- Each student's total, average, and grade are displayed.
- The program also calculates the overall class average and grade.

(b) Construct a C++ program that requests a user to enter the number of rows, columns and the matrix elements. The program should display the entered matrix and find its transpose.

Solution for (b)

```
#include <iostream>

using namespace std;



int main() {

    int rows, cols;

    cout << "Enter number of rows: ";

    cin >> rows;

    cout << "Enter number of columns: ";

    cin >> cols;

    int matrix[50][50], transpose[50][50];

    // Input matrix

    cout << "Enter elements of matrix:" << endl;

    for (int i = 0; i < rows; i++) {

        for (int j = 0; j < cols; j++) {

            cin >> matrix[i][j];

        }
```


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```
}

// Display original matrix

cout << "\nOriginal Matrix:" << endl;

for (int i = 0; i < rows; i++) {

    for (int j = 0; j < cols; j++) {

        cout << matrix[i][j] << "\t";

    }

    cout << endl;

}

// Find transpose

for (int i = 0; i < rows; i++) {

    for (int j = 0; j < cols; j++) {

        transpose[j][i] = matrix[i][j];

    }

}



// Display transpose

cout << "\nTranspose Matrix:" << endl;
```


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```
    for (int i = 0; i < cols; i++) {
        for (int j = 0; j < rows; j++) {
            cout << transpose[i][j] << "\t";
        }
        cout << endl;
    }

    return 0;
}
```

Explanation

- User inputs rows and columns.
- A two-dimensional array matrix stores values.
- The transpose is computed by swapping rows and columns (transpose[j][i] = matrix[i][j]).
- Both original and transpose matrices are displayed.

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2. Use Visual Basic program to create the following interface of Agent.

Solution for (a)

In Visual Basic, we design a form with:

- One **Label** displaying "Agent Services".
- Four **Command Buttons** labeled: *Send Money*, *Withdraw*, *Check Balance*, and *Exit*.
- A few **Labels** to show balances.

This interface allows an agent to interact with the customers through button clicks.

(b) Construct Visual Basic codes which will activate the interface created in part (a). The interface should enable an agent to send money to three customers and provide new balance for a customer and an Agent. Use the information given in the table.

NAME	PHONE NUMBER	BALANCE
Agent	0	100000
Customer 1	1	12000
Customer 2	2	10000
Customer 3	3	25000

Solution for (b)

```
Dim AgentBalance As Double

Dim Customer1 As Double

Dim Customer2 As Double

Dim Customer3 As Double

Private Sub Form_Load()

    AgentBalance = 100000

    Customer1 = 12000

    Customer2 = 10000

    Customer3 = 25000

End Sub



Private Sub cmdSendMoney_Click()

    Dim phone As Integer

    Dim amount As Double



    phone = InputBox("Enter customer phone number (1, 2, or 3):")

    amount = InputBox("Enter amount to send:")
```

```
If amount > AgentBalance Then
    MsgBox "Transaction failed. Insufficient agent balance."
    Exit Sub
End If

Select Case phone
    Case 1
        Customer1 = Customer1 + amount
    Case 2
        Customer2 = Customer2 + amount
    Case 3
        Customer3 = Customer3 + amount
    Case Else
        MsgBox "Invalid customer phone number."
        Exit Sub
End Select
```

```
    AgentBalance = AgentBalance - amount
    MsgBox "Transaction successful!" & vbCrLf & _
        "Customer Balance: " & amount & vbCrLf & _
        "Agent Balance: " & AgentBalance
End Sub

Private Sub cmdWithdraw_Click()
    Dim amount As Double
    amount = InputBox("Enter amount to withdraw:")

    If amount > AgentBalance Then
        MsgBox "Withdrawal failed. Insufficient balance."
    Else
        AgentBalance = AgentBalance - amount
        MsgBox "You have withdrawn " & amount & vbCrLf & _
            "Agent Balance: " & AgentBalance
    End If
End Sub
```

```
Private Sub cmdCheckBalance_Click()
    MsgBox "Your balance is 100000"
End Sub

Private Sub cmdExit_Click()
    End
End Sub
```

Explanation

- Form_Load initializes balances.
- cmdSendMoney_Click transfers money from Agent to customer.
- cmdWithdraw_Click deducts money from Agent balance.
- cmdCheckBalance_Click displays the initial balance message.
- cmdExit_Click closes the program.

(c) The following table shows Form V midterm test records from a certain Secondary School.

Solution for (c)

1. **Create Table in MS Access**
    - Open Access → Create a new database named **Shule**.
    - Create a table named **Student**.
    - Fields: StudentID, Name, Subject1, Subject2, Subject3, TotalMarks, AverageMarks, Grade.
    - Assign proper data types (Text, Number).
2. **Create a Form**
    - Save it as **StudentForm**.
    - Add all fields so records can be entered easily.
3. **Create Query for Grade B**
    - Query criteria: Grade = "B".
    - Save query as **GradeB**.
4. **Create Report**
    - Base it on GradeB query.
    - Save report as **ReportB**.
5. **Activate Form to Auto-calculate Total and Average**

- Use expression builder:
  - TotalMarks: [Subject1] + [Subject2] + [Subject3]
  - AverageMarks: [TotalMarks]/3

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

Solution for (a)

```
<!DOCTYPE html>
<html>
<head>
<title>Frames Example</title>
</head>
<frameset cols="30%,70%">
  <frame src="menu.html" name="menuFrame">
  <frame src="content.html" name="contentFrame">
</frameset>
</html>
```

- menu.html may contain navigation links.
- content.html may display the main content.

(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.

Solution for (b)

```
<!DOCTYPE html>

<html>

<head>

<title>Max Min Calculator</title>

<script>

function calculate() {

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

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

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



    var max = Math.max(n1, n2, n3);

    var min = Math.min(n1, n2, n3);



    alert("Maximum = " + max + "\nMinimum = " + min);

}
```

```
function resetForm() {
    document.getElementById("calcForm").reset();
}
</script>
</head>
<body>
<h2>Max Min Calculator</h2>
<form id="calcForm">
    Number 1: <input type="text" id="num1"><br><br>
    Number 2: <input type="text" id="num2"><br><br>
    Number 3: <input type="text" id="num3"><br><br>
    <input type="button" value="Calculate" onclick="calculate()">
    <input type="button" value="Reset" onclick="resetForm()">
</form>
</body>
</html>
```