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: 2023**

Instructions:

1. this paper consists of section A and B with total of ten questions
2. Answer all questions in Section A and two questions in section B
3. Use a blue or black pen.

1. Considering COVID 19 pandemic outbreak, many places across the world were economically and socially affected. During that moment, lots of social services including schools were in lockdown. Manager at Udzungwa primary school recommended that; mathematics lessons should continue to be taught online alternatively to physical classes. You are required to develop a C++ e-learning program by defining a string array named `str[10]`, to compute area of various shapes such as square, rectangle, triangle, and circle. It shall also be able to calculate volume of rectangular box and cylinder respectively. The program must allow user to choose "A" if intending to compute Area and "V" if intending to compute Volume, followed by the name and measurements of the shape.
Use the following formula to develop your program:
(i) In case of area use;
Name of the figure
- Square: side × side
- Rectangle: length × width
- Triangle: 1/2 × base × height
- Circle: 3.14 × radius × radius

(ii) In case of volume use;
Name of the figure
- Rectangular box: length × width × height
- Cylinder: 3.14 × radius × radius × height

Solution:
Below is the C++ code:

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

int main() {
   char choice;
   string shape;
   cout << "Enter 'A' for Area or 'V' for Volume: ";
   cin >> choice;

   if (choice == 'A' || choice == 'a') {
      cout << "Enter shape name (square/rectangle/triangle/circle): ";
      cin >> shape;

      if (shape == "square") {
         double side;
         cout << "Enter side length: ";
         cin >> side;
         cout << "Area of square: " << side * side << endl;
      } else if (shape == "rectangle") {
```

```
            double length, width;
            cout << "Enter length and width: ";
            cin >> length >> width;
            cout << "Area of rectangle: " << length * width << endl;
        } else if (shape == "triangle") {
            double base, height;
            cout << "Enter base and height: ";
            cin >> base >> height;
            cout << "Area of triangle: " << 0.5 * base * height << endl;
        } else if (shape == "circle") {
            double radius;
            cout << "Enter radius: ";
            cin >> radius;
            cout << "Area of circle: " << 3.14 * radius * radius << endl;
        } else {
            cout << "Invalid shape!" << endl;
        }
    } else if (choice == 'V' || choice == 'v') {
        cout << "Enter shape name (rectangular_box/cylinder): ";
        cin >> shape;

        if (shape == "rectangular_box") {
            double length, width, height;
            cout << "Enter length, width, and height: ";
            cin >> length >> width >> height;
            cout << "Volume of rectangular box: " << length * width * height << endl;
        } else if (shape == "cylinder") {
            double radius, height;
            cout << "Enter radius and height: ";
            cin >> radius >> height;
            cout << "Volume of cylinder: " << 3.14 * radius * radius * height << endl;
        } else {
            cout << "Invalid shape!" << endl;
        }
    } else {
        cout << "Invalid choice!" << endl;
    }

    return 0;
}
```

2. (a) Most of the Mambo Microfinance Bank (MMB) customers are complaining on the poor handling of their loan calculations. Currently, their loans are being calculated by the bank personnel without sharing necessary information to them. To solve this problem, MMB manager decided to add online loan calculator page on the bank website which will allow customers to manage their loan online. Use HTML to design the interactive loan calculator page as given in Figure 1.

Solution:
Below is the HTML code:

```
<!DOCTYPE html>
<html>
<head>
   <title>Loan Calculator</title>
</head>
<body>
   <h1>Enter Loan Information</h1>
   <form>
      1) Amount of the loan (any currency): <input type="text" id="loanAmount"><br><br>
      2) Annual percentage rate of interest: <input type="text" id="interestRate"><br><br>
      3) Repayment period in years: <input type="text" id="repaymentPeriod"><br><br>
      <button type="button" onclick="compute()">Compute</button><br><br>
      <h2>Payment Information</h2>
      4) Your monthly payment: <span id="monthlyPayment"></span><br><br>
      5) Your total payment: <span id="totalPayment"></span><br><br>
      6) Your total interest payments: <span id="totalInterest"></span><br><br>
      <p><a href="form.html" style="font-family: Lucida Handwriting;">Are you interested?</a></p>
   </form>
</body>
</html>
```

2. (b) Use JavaScript to activate the page given in Figure 1 in order to calculate monthly payment, total payment, and total interest payments after clicking the command button “Compute”.

Solution:

Below is the JavaScript code:

```
<script>
function compute() {
   let loan = parseFloat(document.getElementById("loanAmount").value);
   let interest = parseFloat(document.getElementById("interestRate").value);
   let years = parseFloat(document.getElementById("repaymentPeriod").value);

   let monthlyRate = interest / (100 * 12);
```

```
    let months = years * 12;

    let monthlyPayment = loan * monthlyRate / (1 - Math.pow(1 + monthlyRate, -months));
    let totalPayment = monthlyPayment * months;
    let totalInterest = totalPayment - loan;

    document.getElementById("monthlyPayment").textContent = monthlyPayment.toFixed(2);
    document.getElementById("totalPayment").textContent = totalPayment.toFixed(2);
    document.getElementById("totalInterest").textContent = totalInterest.toFixed(2);
}
</script>
```

2. (c) Activate the link "Are you interested?" in Figure 1 to enable interested customers to fill all required details as given in Figure 2.

Solution:
Below is the HTML code for the linked form:

```
<!DOCTYPE html>
<html>
<head>
    <title>Customer Details</title>
</head>
<body>
    <h1>Kindly fill your detail here!!</h1>
    <form action="submitDetails.html" method="post">
        Name: <input type="text" name="name"><br><br>
        Email: <input type="email" name="email"><br><br>
        Phone: <input type="tel" name="phone"><br><br>
        Comment: <textarea name="comment"></textarea><br><br>
        <button type="submit">Send</button>
    </form>
</body>
</html>
```

3. Dobi Washing Company provides washing and cleaning services in Arusha region. Currently, the company operates its billing processes manually, which delays the bill provision to customers. To improve its billing process, the company intends to deploy a Computerized Billing System. Among other functions, the system will enable the receptionist to bill the customer by selecting the requested services along with its discount for his/her customer as shown in Figure 3. Using Visual Basic Program:

(a) Create an interface form as depicted in Figure 3.

(b) Activate the button “Calculate,” so that when a user clicks on, the program displays a Message Box showing the calculated price after discount and customer name.

(c) Activate the button “Clear,” so that when the user clicks on, the program erases all input data in the form.

(d) Activate the button “End,” so that when the user clicks on, the program exits the window form.

Solution:

(a) Creating the interface form:
To create the interface form, follow these steps in Visual Basic:
1. Open Visual Studio and create a new Windows Forms Application project.
2. Design the form layout based on the given interface:
   - Add a `Label` at the top to display "DOBI WASHING COMPANY."
   - Add a `TextBox` and `Label` for the "Customer Name."
   - Add three `CheckBox` controls for "Wash," "Drying," and "Ironing" with their respective prices.
   - Add three `RadioButton` controls for discounts (20%, 10%, None).
   - Add three `Button` controls labeled "Calculate," "Clear," and "End."
3. Arrange and align all elements as per Figure 3.

(b) Activating the "Calculate" button:
In the code for the "Calculate" button, include the logic to calculate the total cost after applying the selected discount. Here's the code:

```
Private Sub btnCalculate_Click(sender As Object, e As EventArgs) Handles btnCalculate.Click
    Dim totalPrice As Double = 0
    Dim discount As Double = 0
    Dim customerName As String = txtCustomerName.Text

    If chkWash.Checked Then
        totalPrice += 5000
    End If
    If chkDrying.Checked Then
        totalPrice += 2000
    End If
    If chkIroning.Checked Then
        totalPrice += 1000
    End If

    If rdo20.Checked Then
        discount = 0.2
    ElseIf rdo10.Checked Then
```

```
        discount = 0.1
    End If

    totalPrice = totalPrice - (totalPrice * discount)

    MessageBox.Show("Customer Name: " & customerName & vbCrLf & "Total Price: " & totalPrice.ToString("C"), "Bill Summary")
End Sub
```

(c) Activating the "Clear" button:
The "Clear" button will reset all input fields and selections. Here's the code:

```
Private Sub btnClear_Click(sender As Object, e As EventArgs) Handles btnClear.Click
    txtCustomerName.Clear()
    chkWash.Checked = False
    chkDrying.Checked = False
    chkIroning.Checked = False
    rdo20.Checked = False
    rdo10.Checked = False
    rdoNone.Checked = False
End Sub
```

(d) Activating the "End" button:
The "End" button will close the application. Here's the code:

```
Private Sub btnEnd_Click(sender As Object, e As EventArgs) Handles btnEnd.Click
    Me.Close()
```