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: 2022**

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) In the year 2020, ABC Secondary School expanded its enrollment capacity twice higher than the normal rate. The increase in the number of students made it difficult to manually calculate and report academic performance for each student. Use an array concept to develop a C++ program which prompts a user to enter the number of students, student name, and scores for the seven subjects. The program should compute the total and average performance for each student.

Solution:

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

int main() {
   int numStudents, scores[7], total;
   double average;
   string name;

   cout << "Enter the number of students: ";
   cin >> numStudents;

   for (int i = 1; i <= numStudents; i++) {
      cout << "\nEnter the name of student " << i << ": ";
      cin >> name;
      total = 0;

      for (int j = 0; j < 7; j++) {
         cout << "Enter score for subject " << j + 1 << ": ";
         cin >> scores[j];
         total += scores[j];
      }

      average = total / 7.0;

      cout << "\nStudent Name: " << name;
      cout << "\nTotal Score: " << total;
      cout << "\nAverage Score: " << average << endl;
   }

   return 0;
}
```

1. (b) The XVDF football stadium has a total capacity of 200 to accommodate football fans. The stadium manager wants to keep track of the number of attended followers for each match in real time. You are assigned to develop a C++ program that reads gender, counts, and displays the number of attended females, males, total followers, and remaining slots. The program must be able to print the message "Sorry the pitch is full" when the count reaches maximum entries.

Solution:

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

int main() {
   int capacity = 200, males = 0, females = 0, total = 0, remaining;
   char gender;

   while (total < capacity) {
      cout << "\nEnter gender (M for Male, F for Female): ";
      cin >> gender;

      if (gender == 'M' || gender == 'm') {
         males++;
      } else if (gender == 'F' || gender == 'f') {
         females++;
      } else {
         cout << "Invalid input. Please enter 'M' or 'F'." << endl;
         continue;
      }

      total = males + females;
      remaining = capacity - total;

      cout << "\nMales: " << males;
      cout << "\nFemales: " << females;
      cout << "\nTotal Followers: " << total;
      cout << "\nRemaining Slots: " << remaining << endl;

      if (total == capacity) {
         cout << "\nSorry the pitch is full." << endl;
         break;
      }
   }

   return 0;
}
```

2. (a) The director at Open Mind nursery school wants to develop a system that will assist teachers to demonstrate the concept of vowels present in different names. Develop a JavaScript function that will prompt students to enter the name in small letters and count the number of vowels present when the user clicks the button OK.

Solution:

```
<!DOCTYPE html>
<html>
<head>
   <title>Vowel Counter</title>
   <script>
      function countVowels() {
         let name = prompt("Write Your Name in Small Letters:");
         if (name === null || name === "") {
            alert("No input provided!");
            return;
         }

         let vowels = "aeiou";
         let count = 0;

         for (let char of name) {
            if (vowels.includes(char)) {
               count++;
            }
         }

         alert("The number of vowels in the name is: " + count);
      }
   </script>
</head>
<body>
   <button onclick="countVowels()">OK</button>
</body>
</html>
```

2. (b) The Wakwetu SACCOSS offers different types of loans to its members with an annual interest rate of 12% per year. Design an interface using HTML to enter the loan amount, interest rate, and repayment period, and automate it with JavaScript.

Solution:

HTML and JavaScript Code:

```
<!DOCTYPE html>
<html>
<head>
  <title>Wakwetu SACCOSS Loan Calculator</title>
  <script>
    function calculateLoan() {
      let loanAmount = parseFloat(document.getElementById("loanAmount").value);
      let interestRate = parseFloat(document.getElementById("interestRate").value) / 100;
      let period = parseInt(document.getElementById("period").value);

      if (isNaN(loanAmount) || isNaN(interestRate) || isNaN(period)) {
        alert("Please enter valid numbers.");
        return;
      }

      let totalInterest = loanAmount * interestRate * period;
      let totalRepayment = loanAmount + totalInterest;
      let monthlyRepayment = totalRepayment / (period * 12);

      alert(
        `Total Repayment: ${totalRepayment.toFixed(2)}\n` +
        `Monthly Repayment: ${monthlyRepayment.toFixed(2)}`
      );
    }
  </script>
</head>
<body>
  <h1>Wakwetu SACCOSS</h1>
  <h2>Calculates loan repayment period</h2>
  <form>
    <label>Loan Amount:</label>
    <input type="text" id="loanAmount"><br><br>
    <label>Period (years):</label>
    <input type="text" id="period"><br><br>
    <label>Interest Rate (%):</label>
    <input type="text" id="interestRate"><br><br>
    <button type="button" onclick="calculateLoan()">Loan Statement</button>
  </form>
</body>
</html>
```

3. (a) Create interfaces shown in Figure 3.

Solution for the Home Page Interface (Figure 3):
1. Open Visual Basic and create a new form.
2. Add the following components:
  - A `Label` with the caption **"MWAMBE HIGH SCHOOL"**.
  - A second `Label` with the caption **"Library Management System"**.
  - A third `Label` with the caption **"Click check box to open the task"**.
  - Three `CheckBox` controls:
    - `chkBorrowBooks` with the caption **"Borrow books"**.
    - `chkAddBooks` with the caption **"Add books"**.
    - `chkFindBooks` with the caption **"Find books"**.
  - A `CommandButton` named `cmdOpen` with the caption **"Open"**.
Form Design Instructions:
- Align the labels, checkboxes, and button as shown in Figure 3.
- Set the form caption to "Library System".

(b) Activate the button “Open” together with checkbox “Borrow books” in Figure 3 so that when the Librarian clicks the “Open” button, the new form “Borrow Book” given in Figure 4 will open.

Solution for Activating the "Open" Button:

1. Create a second form for the "Borrow Book" page.
2. Add the following controls to the "Borrow Book" form:
  - TextBoxes for:
    - `txtStudentNumber` with the label "Student Number".
    - `txtBookNumber` with the label "Book Number".
    - `txtPublisherName` with the label "Publisher Name".
    - `txtYearPublished` with the label "Year Published".
    - `txtTitle` with the label "Title".
  - Buttons for:
    - `cmdSend` with the caption "Send".
    - `cmdClear` with the caption "Clear".
    - `cmdExit` with the caption "Exit".

3. Add the following code to the "Open" button in the Home Page form:

```
Private Sub cmdOpen_Click()
   If chkBorrowBooks.Value = 1 Then
      BorrowBookForm.Show ' Opens the Borrow Book form
   Else
      MsgBox "Please select 'Borrow books' to proceed.", vbExclamation
   End If
```

```
End Sub
```

4. Add functionality to the "Borrow Book" form buttons:

```
Private Sub cmdSend_Click()
    ' Send the data (add validation or save to a database/file)
    MsgBox "Data has been sent successfully.", vbInformation
End Sub

Private Sub cmdClear_Click()
    ' Clear all the input fields
    txtStudentNumber.Text = ""
    txtBookNumber.Text = ""
    txtPublisherName.Text = ""
    txtYearPublished.Text = ""
    txtTitle.Text = ""
End Sub
Private Sub cmdExit_Click()
    ' Close the Borrow Book form
    Unload Me
End Sub
```