**SECTION A (Marks: 24)**

1. Differentiate between the following terms:
   1. Program and Programming
   2. Constant and Variable
2. Write a simple program to demonstrate the structure of a C++ program. Your program should display your full name 1000 times, along with your registration number and the year of completion of your bachelor's degree studies. Each execution should have the output on a different line.
3. Write the output of the following source code:

#include <iostream>

using namespace std;

int main() {

double x = 9.92543, y = 9.5, result;

cout << "This program compares " << x << " and " << y << endl;

result = (x > y) ? x : y;

cout << "The greater number is " << result;

return 0;

}

1. Write the general syntax for each of the following:
   1. Switch case
   2. Do-while loop
   3. Function definition
   4. Function declaration
2. Write a program that calculates the string length of your full name and displays your full name while stating the length.
3. Write a C++ program that displays odd numbers between 61 and 121 exclusively. Use a for loop or do-while loop.

**SECTION B (Marks: 36)**

1. Write a C++ program that performs an arithmetic operation on two double numbers based on the user's choice and prints the results on the screen. Assume that the numbers are non-zero. (12 marks)
2. Write a C++ program that accepts student scores for eight subjects from the user. The program should display the scores and determine the highest score. (12 marks)
3. Write a C++ program that converts either meters to centimeters or vice versa, depending on the user's choice. Your program should consist of three functions: main(), MeterToCentimeter(), and CentimeterToMeter(). The main() function should provide available options and prompt the user to enter the required parameter. It should invoke either MeterToCentimeter() or CentimeterToMeter() based on the user's choice and display the results. Use a switch statement for this functionality. (12 marks)
4. Write a C++ program that provides a user interface for login. The program should prompt the user to enter their username. If the username is entered correctly (it should be your actual surname), the program should then prompt for the password (which should be 2023). If both the username and password are correct, display the message: "Login Successful, You're Welcome to Learn C++ Programming." If the password is incorrect, display: "Wrong password! It doesn't match! Try again." If the username is incorrect, display: "Username not found! Goodbye." (12 marks)

**CS 6202: OBJECT ORIENTED PROGRAMMING**

**Test 1**

1. Write a C program that generates the multiplication table for the number 7.
2. Write a C++ program that prompts the user to enter any integer number and determines whether it is divisible by:
   * a) Both 6 and 9
   * b) Only 6
   * c) Only 9
   * d) Not divisible by either 6 or 9.
3. What is the output of the following source code?

#include <iostream>

using namespace std;

int main() {

int i, n, total = 0;

total = total + i;

printf("The sum of this series is %i\n", total);

return 0;

}

1. Write a program that generates the following pattern:

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

1 2 3 4 5 6

SOLUTION

**SECTION A (Marks: 24)**

1. **Differentiate between the following terms:**
   * **a) Program and Programming:**  
     A program is a set of instructions written in a programming language to perform a specific task. Programming is the process of writing, testing, and maintaining these programs.
   * **b) Constant and Variable:**  
     A constant is a fixed value that cannot be altered during the execution of a program. A variable, on the other hand, is a storage location identified by a name that can hold different values during program execution.

**C++ Program to Display Name 1000 Times:**

#include <iostream>

using namespace std;

class DisplayInfo {

public:

void showDetails(const string& name, const string& regNo, int year) {

for (int i = 0; i < 1000; ++i) {

cout << name << ", " << regNo << ", Year: " << year << endl;

}

}

};

int main() {

DisplayInfo info;

info.showDetails("Your Full Name", "Your Registration Number", 2023);

return 0;

}

**Output of the Given Source Code:**

This program compares 9.92543 and 9.5

The greater number is 9.92543

1. **General Syntax:**

**a) Switch case:**

switch (expression) {

case value1:

// code block

break;

case value2:

// code block

break;

default:

// code block

}

**b) Do-while loop:**

do {

// code block

} while (condition);

**c) Function definition:**

returnType functionName(parameters) {

// code block

}

**d) Function declaration:**

returnType functionName(parameters);

1. **Program to Calculate String Length:**

#include <iostream>

using namespace std;

class StringLengthCalculator {

public:

void displayLength(const string& name) {

cout << "Full Name: " << name << ", Length: " << name.length() << endl;

}

};

int main() {

StringLengthCalculator calc;

calc.displayLength("Your Full Name");

return 0;

}

1. **C++ Program to Display Odd Numbers:**

#include <iostream>

using namespace std;

class OddNumberPrinter {

public:

void printOddNumbers() {

for (int i = 63; i < 121; i += 2) {

cout << i << endl;

}

}

};

int main() {

OddNumberPrinter printer;

printer.printOddNumbers();

return 0;

}

**SECTION B (Marks: 36)**

1. **C++ Program for Arithmetic Operations:**

#include <iostream>

using namespace std;

class Calculator {

public:

void performOperation(double num1, double num2, char operation) {

double result;

switch (operation) {

case '+':

result = num1 + num2;

break;

case '-':

result = num1 - num2;

break;

case '\*':

result = num1 \* num2;

break;

case '/':

result = num1 / num2;

break;

default:

cout << "Invalid operation!" << endl;

return;

}

cout << "Result: " << result << endl;

}

};

int main() {

double num1, num2;

char operation;

cout << "Enter two numbers: ";

cin >> num1 >> num2;

cout << "Enter operation (+, -, \*, /): ";

cin >> operation;

Calculator calc;

calc.performOperation(num1, num2, operation);

return 0;

}

1. **C++ Program to Accept Student Scores:**

#include <iostream>

using namespace std;

class ScoreManager {

public:

void acceptScores() {

int scores[8], highest = 0;

cout << "Enter scores for 8 subjects:" << endl;

for (int i = 0; i < 8; ++i) {

cin >> scores[i];

if (scores[i] > highest) highest = scores[i];

}

cout << "Scores: ";

for (int i = 0; i < 8; ++i) {

cout << scores[i] << " ";

}

cout << "\nHighest score: " << highest << endl;

}

};

int main() {

ScoreManager manager;

manager.acceptScores();

return 0;

}

1. **C++ Program for Unit Conversion:**

#include <iostream>

using namespace std;

class Converter {

public:

void MeterToCentimeter(double meters) {

cout << meters << " meters = " << meters \* 100 << " centimeters" << endl;

}

void CentimeterToMeter(double centimeters) {

cout << centimeters << " centimeters = " << centimeters / 100 << " meters" << endl;

}

void menu() {

int choice;

double value;

cout << "1. Convert Meters to Centimeters\n";

cout << "2. Convert Centimeters to Meters\n";

cout << "Enter your choice: ";

cin >> choice;

cout << "Enter the value: ";

cin >> value;

switch (choice) {

case 1:

MeterToCentimeter(value);

break;

case 2:

CentimeterToMeter(value);

break;

default:

cout << "Invalid choice!" << endl;

}

}

};

int main() {

Converter converter;

converter.menu();

return 0;

}

1. **C++ Program for User Login Interface:**

#include <iostream>

using namespace std;

class LoginSystem {

public:

void login() {

string username, password;

cout << "Enter username: ";

cin >> username;

if (username == "YourSurname") {

cout << "Enter password: ";

cin >> password;

if (password == "2023") {

cout << "Login Successful, You're Welcome to Learn C++ Programming." << endl;

} else {

cout << "Wrong password! It doesn't match! Try again." << endl;

}

} else {

cout << "Username not found! Goodbye." << endl;

}

}

};

int main() {

LoginSystem login;

login.login();

return 0;

}