Se1 1

Q1A: Write a program to input two numbers and display their sum.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare variables to store input numbers

float num1, num2, sum;

// Input two numbers from the user

cout << "Enter the first number: ";

cin >> num1;

cout << "Enter the second number: ";

cin >> num2;

// Calculate the sum of the two numbers

sum = num1 + num2;

// Display the sum

cout << "The sum of " << num1 << " and " << num2 << " is: " << sum << endl;

return 0;

}

Q2Write a program to check if a given year is a leap year.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

int year;

// Input year from user

cout << "Enter a year: ";

cin >> year;

// Check if the year is a leap year

if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {

cout << year << " is a leap year." << endl;

} else {

cout << year << " is not a leap year." << endl;

}

return 0;

}

Q3: Write a program to demonstrate simple inheritance by creating a base class Animal with an attribute name and a derived class Dog that adds a method bark(). (6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

// Base class Animal

class Animal {

public:

// Attribute for the animal's name

string name;

// Constructor to initialize the name

Animal(string n) : name(n) {}

// Method to display the name of the animal

void display() {

cout << "Animal Name: " << name << endl;

}

};

// Derived class Dog inheriting from Animal

class Dog : public Animal {

public:

// Constructor to initialize the name (calls base class constructor)

Dog(string n) : Animal(n) {}

// Method to make the dog bark

void bark() {

cout << name << " says: Woof! Woof!" << endl;

}

};

int main() {

// Create an object of the Dog class

Dog myDog("Buddy");

// Call the display method of Animal class

myDog.display();

// Call the bark method of Dog class

myDog.bark();

return 0;

}

Set2

Q1Write a program to calculate the area of a rectangle by taking its length and width as input. (6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare variables for length, width, and area

float length, width, area;

// Input the length of the rectangle

cout << "Enter the length of the rectangle: ";

cin >> length;

// Input the width of the rectangle

cout << "Enter the width of the rectangle: ";

cin >> width;

// Calculate the area of the rectangle

area = length \* width;

// Output the area of the rectangle

cout << "The area of the rectangle is: " << area << endl;

return 0;

}

Q2: Write a program to check if a person is eligible to vote (age 18 or above).(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare a variable to store the person's age

int age;

// Prompt the user to enter their age

cout << "Enter your age: ";

cin >> age;

// Check if the person is eligible to vote

if (age >= 18) {

cout << "You are eligible to vote." << endl;

} else {

cout << "You are not eligible to vote." << endl;

}

return 0;

}

Q3: Write a program to input a positive integer N and calculate the sum of the first N natural numbers using a for loop.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare a variable to store the number N and the sum

int N, sum = 0;

// Input the value of N

cout << "Enter a positive integer N: ";

cin >> N;

// Check if the entered number is positive

if (N <= 0) {

cout << "Please enter a positive integer." << endl;

return 1; // Exit the program if the input is not positive

}

// Use a for loop to calculate the sum of the first N natural numbers

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

sum += i; // Add the current number to sum

}

// Output the sum

cout << "The sum of the first " << N << " natural numbers is: " << sum << endl;

return 0;

}

Set3

Q1: Write a program to find the product of three numbers entered by the user.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare variables to store three numbers

float num1, num2, num3, product;

// Input the three numbers from the user

cout << "Enter the first number: ";

cin >> num1;

cout << "Enter the second number: ";

cin >> num2;

cout << "Enter the third number: ";

cin >> num3;

// Calculate the product of the three numbers

product = num1 \* num2 \* num3;

// Output the result

cout << "The product of " << num1 << ", " << num2 << " and " << num3 << " is: " << product << endl;

return 0;

}

Q2Write a program to check if a password is valid. A password is valid if it has at least 8 characters and does not contain any spaces.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

#include <string>

using namespace std;

int main() {

// Declare a variable to store the password

string password;

// Input the password from the user

cout << "Enter your password: ";

getline(cin, password); // Use getline to read spaces

// Check if the password has at least 8 characters and contains no spaces

if (password.length() >= 8 && password.find(' ') == string::npos) {

cout << "Password is valid." << endl;

} else {

cout << "Password is invalid." << endl;

}

return 0;

}

Q3: Write a program to check if a number entered by the user is positive, negative, or zero.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare a variable to store the number

int number;

// Input the number from the user

cout << "Enter a number: ";

cin >> number;

// Check if the number is positive, negative, or zero

if (number > 0) {

cout << "The number is positive." << endl;

} else if (number < 0) {

cout << "The number is negative." << endl;

} else {

cout << "The number is zero." << endl;

}

return 0;

}

Set4

Q1: Write a program to take two boolean inputs (1 for true, 0 for false) and display the results of AND (&&) and OR (||) operations.(6Marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare two boolean variables to store the inputs

bool a, b;

// Input two boolean values (1 for true, 0 for false)

cout << "Enter the first boolean value (1 for true, 0 for false): ";

cin >> a;

cout << "Enter the second boolean value (1 for true, 0 for false): ";

cin >> b;

// Perform AND (&&) operation

bool andResult = a && b;

cout << "The result of AND (a && b) is: " << andResult << endl;

// Perform OR (||) operation

bool orResult = a || b;

cout << "The result of OR (a || b) is: " << orResult << endl;

return 0;

}

Q2Write a program to assign a grade based on marks: •90 and above: A •80 to 89 : B •70 to 79 : C •Below 70 : Fail. (6Marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare a variable to store marks

int marks;

// Input marks from the user

cout << "Enter the marks: ";

cin >> marks;

// Check the range of marks and assign a grade

if (marks >= 90) {

cout << "Grade: A" << endl;

} else if (marks >= 80) {

cout << "Grade: B" << endl;

} else if (marks >= 70) {

cout << "Grade: C" << endl;

} else {

cout << "Grade: Fail" << endl;

}

return 0;

}

Q3: Write a program to calculate the factorial of a number using recursion.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

// Recursive function to calculate factorial

int factorial(int n) {

if (n <= 1) {

return 1; // Base case: factorial of 0 or 1 is 1

} else {

return n \* factorial(n - 1); // Recursive call

}

}

int main() {

// Declare a variable to store the number

int num;

// Input the number from the user

cout << "Enter a number: ";

cin >> num;

// Check for non-negative input

if (num < 0) {

cout << "Factorial is not defined for negative numbers." << endl;

} else {

// Call the recursive function and display the result

cout << "The factorial of " << num << " is: " << factorial(num) << endl;

}

return 0;

}

Set5

Q1Write a program to check if a number is divisible by 5 and 3..(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare a variable to store the number

int number;

// Input the number from the user

cout << "Enter a number: ";

cin >> number;

// Check if the number is divisible by both 5 and 3

if (number % 5 == 0 && number % 3 == 0) {

cout << "The number is divisible by both 5 and 3." << endl;

} else {

cout << "The number is NOT divisible by both 5 and 3." << endl;

}

return 0;

Q2: Write a program to input a number (1 to 12) and display the corresponding month name using a switch statement (6Marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare a variable to store the month number

int month;

// Input the month number from the user

cout << "Enter a number (1 to 12): ";

cin >> month;

// Use switch statement to display the corresponding month name

switch(month) {

case 1:

cout << "January" << endl;

break;

case 2:

cout << "February" << endl;

break;

case 3:

cout << "March" << endl;

break;

case 4:

cout << "April" << endl;

break;

case 5:

cout << "May" << endl;

break;

case 6:

cout << "June" << endl;

break;

case 7:

cout << "July" << endl;

break;

case 8:

cout << "August" << endl;

break;

case 9:

cout << "September" << endl;

break;

case 10:

cout << "October" << endl;

break;

case 11:

cout << "November" << endl;

break;

case 12:

cout << "December" << endl;

break;

default:

cout << "Invalid input! Please enter a number between 1 and 12." << endl;

break;

}

return 0;

}

Q3Write a program to find the largest number among three numbers entered by the user.(6 marks) Write the breakdown for the above program (2 marks) Give 2 possible input/ output cases (2 marks)

#include <iostream>

using namespace std;

int main() {

// Declare variables to store three numbers

int num1, num2, num3;

// Input the three numbers from the user

cout << "Enter the first number: ";

cin >> num1;

cout << "Enter the second number: ";

cin >> num2;

cout << "Enter the third number: ";

cin >> num3;

// Compare the three numbers to find the largest

if (num1 >= num2 && num1 >= num3) {

cout << "The largest number is: " << num1 << endl;

} else if (num2 >= num1 && num2 >= num3) {

cout << "The largest number is: " << num2 << endl;

} else {

cout << "The largest number is: " << num3 << endl;

}

return 0;

}