**School of Computing and Data Science**

**Sai University**

**Practice Set 1: C++ Basics**

Q1. Write a program to read your name and age, and print them in the format:

Hello <name>, you are <age> years old.

#include <iostream>

#include <string>   // Header file for string operations

using namespace std;

int main() {

    string name;

    int age;

    cout << "Enter your name: ";

    cin >> name;   // take name first

    cout << "Enter your age: ";

    cin >> age;    // then ask for age

    cout << "Hello " << name << ", you are " << age << " years old." << endl;

    return 0;

}

Q2. Read an integer and check whether it is even or odd.

#include <iostream>

#include <string>   // Header file for string operations

using namespace std;

int main() {

    int num;

    cout << "Enter a number: ";

    cin >> num;  // Take input for the number

    if(num % 2 == 0) {

        cout << num << " is even." << endl;  // Check if the number is even

    } else {

        cout << num << " is odd." << endl;   // Otherwise, it is odd

    }

    return 0;

}

Q3. Take two integers as input and print the larger one using if-else.

#include <iostream>

using namespace std;

int main(){

    int num1;

    int num2;

    cout << "enter number 1:";

    cin >> num1;

    cout << "enter number 2:";

    cin >> num2;

    if (num1 > num2){

        cout << num1 << " is greater than " << num2 << endl;

    }

    else if (num2 > num1){

        cout << num2 << " is greater than " << num1 << endl;

    }

    else{

        cout << "Both numbers are equal" << endl;

    }

    return 0; // Exit status of program

}

Q4. Read three integers and print the largest number.

#include <iostream>

using namespace std;

int main(){

    int num1;

    cout << "enter num1: ";

    cin >> num1;

    int num2;

    cout << "enter num2: ";

    cin >> num2;

    int num3;

    cout << "enter num3: ";

    cin >> num3;

    if(num1 > num2 && num1 > num3){

        cout << num1 << " is the greatest number." << endl;

    }

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

        cout << num2 << " is the greatest number." << endl;

    }

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

        cout << num3 << " is the greatest number." << endl;

    }

    else{

        cout << "There is no single greatest number, some numbers are equal." << endl;

    }

}

Q5. Take an integer and check whether it is positive, negative, or zero.

#include <iostream>

using namespace std;

int main(){

    int num;

    cout << "enter a number: ";

    cin >> num;

    if(num>0){

        cout << num << " is positive" << endl;

    }

    else if(num<0){

        cout << num << " is negative" << endl;

    }

    else{

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

    }

    return 0; // Exit status of program

}

Q6. Write a program to print the multiplication table of a given number using

a for loop.

#include <iostream>

using namespace std;

int main(){

    int num;

    cout << "enter a number: ";

    cin >> num;

    for(int i = 1; i <=10; i++){

        cout << num << " \* " << i << " = " << num \* i << endl; // Print multiplication table

    }

    return 0; // Exit status of program

}

Q7. Print all numbers from 1 to 100 using a for loop.

#include <iostream>

using namespace std;

int main(){

    for(int i = 1; i <=100; i++){

        cout << i << endl;

    }

    return 0; // Exit status of program

}

Q8. Find the sum of the first n natural numbers.

#include <iostream>

using namespace std;

int main() {

    int n;

    cout << "Enter a number: ";

    cin >> n;

    int sum = n \* (n + 1) / 2;  // formula

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

    return 0;

}

Q9. Find the factorial of a given number n.

#include <iostream>

using namespace std;

int main() {

    int n;

    cout << "Enter a number: ";

    cin >> n;

    int fac = 1;

    for(int i = n; i >= 1; i--){

        fac \*= i;

    }

    cout << "Factorial of " << n << " is " << fac << endl;

    return 0;

}

Q10. Check whether a given year is a leap year or not.

#include <iostream>

using namespace std;

int main() {

    int n;

    cout << "Enter the year: ";

    cin >> n;

    if(n % 4 == 0) {

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

    } else {

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

    }

    return 0;

}

Q11. Given marks of a student (0–100), print the grade: A (≥90), B (80–89),

C (70–79), D (60–69), F (below 60).

#include <iostream>

using namespace std;

int main() {

    int n;

    cout << "Your mark: ";

    cin >> n;

    if(n >= 90) {

        cout << "A" << endl;

    }

    else if(n>80 && n<=89) {

        cout << "B" << endl;

    }

    else if(n>70 && n<=79) {

        cout << "C" << endl;

    }

    else if(n>60 && n<=69) {

        cout << "D" << endl;

    }

    else {

        cout << "F" << endl;

    }

    return 0;

}

Q12. Find the roots of a quadratic equation ax2 + bx + c = 0. (Handle real and

imaginary roots using if-else.)

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    double a,b,c;

    cout <<"Enter coefficient a,d and c: ";

    cin >> a >> b >> c;

    double D = b\*b - 4\*a\*c;

    if (D > 0) {

        double root1 = (-b + sqrt(D)) / (2\*a);

        double root2 = (-b - sqrt(D)) / (2\*a);

        cout << "Roots are real and distinct: " << root1 << " and " << root2 << endl;

    }

    else if (D==0){

        double root = -b / (2\*a);

        cout <<"roots are real and equal:" << root << endl;

    }

    else{

        double realpart = -b/(2\*a);

        double imagpart = sqrt(-D)/(2\*a);

        cout << "Roots are complex and imaginary: " << realpart << "+" << imagpart << "i and " << realpart << "-" << imagpart << "i" << endl;

    }

    return 0;

}

Q13. Check whether a number is prime or not.

#include <iostream>

using namespace std;

int main() {

    int a;

    cout << "Enter the number: ";

    cin >> a;

    int count = 0;

    for (int i = 1; i <= a; i++) {

        if (a % i == 0) {

            count++;

        }

    }

    if (count == 2) {

        cout << a << " is a prime number";

    } else {

        cout << a << " is not a prime number";

    }

    return 0;

}

Q14. Print all prime numbers between 1 and 100.

Q15. Reverse the digits of a given number. (Example: input 1234 → output

4321)

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int a;

    int i;

    cout << "Enter an integer: ";

    cin >> a;

    while(a != 0) {

        i = a % 10;

        cout << i << endl;

        a = a / 10;

    }

}

Q16. Find the sum of digits of a given number. (Example: input 1234 → output

10)

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int a;

    int i;

    int b = 0;

    cout << "Enter an integer: ";

    cin >> a;

    while(a != 0) {

        i = a % 10;

        b+= i;

        a = a / 10;

    }

    cout << "Sum of digits: " << b << endl;

    return 0;

}

Q17. Generate the Fibonacci series up to n terms.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int a=0;

    int b=1;

    int n;

    int i;

    cout << "Enter the number: ";

    cin >> n;

    cout << a << " " << b << " ";

    for(i=1; i<=n; i++){

        int c = a + b;

        cout << c << " ";

        a = b;

        b = c;

        i++;

    }

    return 0;

}

Q18. Check whether a given number is a palindrome or not. (Example: 121 is

palindrome, 123 is not.)

#include <iostream>

using namespace std;

int main() {

    int a, original, reversed = 0, digit;

    cout << "Enter an integer: ";

    cin >> a;

    int count=0;

    int temp=a;

    original = a;

    while (temp != 0) {

        temp /= 10;

        count++;

    }

    for(int i=0;i<count;i++){

        digit = a % 10;

        reversed = reversed \* 10 + digit;

        a = a / 10;

    }

    if (original == reversed) {

        cout << "The number is a palindrome." << endl;

    } else {

        cout << "The number is not a palindrome." << endl;

    }

    return 0;

}

Q19. Write a program to calculate the simple interest. Formula: SI =P ×R×T/100

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int p;

    cout <<"enter the initial principal amount: ";

    cin >> p;

    double r;

    cout <<"enter the rate of interest: ";

    cin >> r;

    int t;

    cout <<"enter the time in years: ";

    cin >> t;

    double A = p\*r\*t/100;

    cout <<"the simple interest is: " << A << endl;

    return 0;

}

Q20. Write a program to find the greatest common divisor (GCD) of two numbers using a loop.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int a;

    cout << "Enter num1: ";

    cin >> a;

    int b;

    cout << "Enter num2: ";

    cin >> b;

    int c;

    int d;

    while(d != 0){

        c = a % b;

        d = b % c;

        a = b;

        b = c;

    }

    cout << "GCD is: " << c << endl;

    return 0;

}