**School of Computing and Data Science**

**Sai University**

**Practice Set 2: C++ Basics**

1. Write a program to print numbers from 1 to 10 using a for loop.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    for (int i = 0; i<=10; i++){

        cout << i << endl;

    }

    return 0;

}

2. Print the first 10 even numbers using a while loop.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    for (int i = 0; i<=10; i++){

        if(i%2==0){

            cout << i << endl;

        }

    }

    return 0;

}

3. Print the multiplication table of a given number using a do-while loop.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int n;

    int m;

    int i=1;

    cout << "Enter a number: ";

    cin >> n;

    do{

        cout << n << " X " << i << " = " << n\*i << endl;

        i++;

    }while(i<=10);

    return 0;

}

4. Find the sum of the first N natural numbers (input N) using a for

loop.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int n;

    int m=0;

    cout << "Enter a number: ";

    cin >> n;

    for(int i = 1; i <= n; i++) {

      m+=i;

    }

    cout << "Sum from 1 to " << n << " is: " << m << endl;

    return 0;

}

5. Write a program to find the factorial of a number using a while loop.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int n;

    int m;

    cout << "Enter a number: ";

    cin >> n;

    int temp = n;

    m=1;

    while(n>0){

        m\*=n;

        n--;

    }

    cout << "Factorial of " << temp << " is " << m << endl;

    return 0;

}

6. Print the digits of a number in reverse order using a do-while loop.

#include <iostream>

#include <cmath>

using namespace std;

int main(){

    int a;

    int i;

    cout << "Enter a number: ";

    cin >> a;

    do{

        i=a%10;

        cout << i << endl;

        a=a/10;

    }while(a!=0);

    return 0;

}

7. Check whether a number is prime or not using a for loop.

#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;

}

8. Print all odd numbers between 1 and 50 using a while loop.

#include <iostream>

using namespace std;

int main() {

    int i=2;

    while(i<50){

        if(i%2!=0){

            cout<<i<<endl;

        }

        i++;

    }

    return 0;

}

9. Write a program that keeps asking the user for input until they enter a negative number (do-while loop).

#include <iostream>

using namespace std;

int main() {

    int n;

    do{

        cout << "Enter a number: ";

        cin >> n;

    }while(n>0);

    //cout << "You entered a non-positive number: " << n << endl;

    return 0;

}

10. Print the sum of all even numbers from 1 to 100 using a for loop.

#include <iostream>

using namespace std;

int main() {

    int all=0;

    for (int i =1; i<=100; i++){

        if(i%2==0){

            all+=i;

        }

    }

    cout <<"the sum of even numbers from 1 to 100 is: " << all << endl;

    return 0;

}

11. Write a program to calculate the power of a number (a^b) using a while loop.

#include <iostream>

using namespace std;

int main() {

    int a;

    int b;

    cout << "Enter num1: ";

    cin >> a;

    cout << "Enter num2: ";

    cin >> b;

    int i=0;

    int power=1;

    while(i<b){

        power\*=a;

        i++;

    }

    cout << "Result: " << power << endl;

    return 0;

}

12. Use if-else with a loop: Print “Fizz” if a number is divisible by 3, “Buzz” if divisible by 5, and “FizzBuzz” if divisible by both (for numbers 1 to 50).

#include <iostream>

using namespace std;

int main() {

    for (int i = 1; i < 50; ++i) {

        if(i%3==0 && i%5==0)

            cout << "FizzBuzz" << endl;

        else if(i%3==0)

            cout << "Fizz" << endl;

        else if(i%5==0)

            cout << "Buzz" << endl;

        else

            cout << i << endl;

    }

    return 0;

}

13. Take a number as input and check if it is an Armstrong number using a while loop.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int a, og,n,count=0,sum=0;

    cout << "enter a number: " << endl;

    cin >> a;

    og=a;

    n=a;

    while(n!=0){

        n=n/10;

        count++;

    }

    n=a;

    while(n!=0){

        int digit = n % 10;

        sum+=pow(digit,count);

        n=n/10;

    }

    if(sum==og){

        cout<<"Armstrong number"<<endl;

    }

    else{

        cout<<"Not an Armstrong number"<<endl;

    }

    return 0;

}

14. Write a program to find the largest digit in a number using a do-while loop.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    int a;

    cout << "enter a number: " << endl;

    cin >> a;

    int n=a;

    int old\_digit;

    int greatest\_digit=0;

    while(n>0){

        old\_digit=n%10;

        if(old\_digit>greatest\_digit){

            greatest\_digit=old\_digit;

        }

        n=n/10;

    }

    cout << "greatest digit is: " << greatest\_digit << endl;

    return 0;

}

15. Print a simple pattern using loops:

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16. Use a for loop to check if a number is a palindrome.

#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;

}

17. Write a program to find the GCD (Greatest Common Divisor) of two numbers using a while 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;

}

18. Print the Fibonacci sequence up to N terms using a for loop.

#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;

}

19. Use if-else inside a for loop to print whether numbers from 1 to 20 are even or odd.

#include <iostream>

#include <cmath>

using namespace std;

int main() {

    for(int i=1;i<=20;i++){

        if(i%2==0){

            cout<<i<<" is even"<<endl;

        } else {

            cout<<i<<" is odd"<<endl;

        }

    }

    return 0;

}

20. Write a program to keep taking marks as input until the user enters−1, then print the average of the entered marks.

#include <iostream>

using namespace std;

int main() {

    int marks;

    int n = 0;

    int sum = 0;

    double avg = 0.0; // use double for accuracy

    while (true) {

        cout << "Enter marks (-1 to end): ";

        cin >> marks;

        if (marks == -1) {

            break;

        }

        sum += marks;

        n++;

    }

    if (n > 0) {

        avg = (double)sum / n;  // cast to double to avoid integer division

        cout << "Average marks: " << avg << endl;

    } else {

        cout << "No marks entered." << endl;

    }

    return 0;

}