**16 – 25 questions**

// Q16. two integers opposite in sign (without conditional statements)

#include<iostream>

using namespace std;

bool opposite(int a,int b){

    return (a^b) <0;

}

int main(){

    int a,b;

    cout<<"Enter two numbers: ";

    cin>>a>>b;

    if (opposite(a,b))

        cout<<"The two numbers have opposite sign";

    else

        cout<<"The two numbers have same sign";

    return 0;

}

// Q17. division without / operator

#include <iostream>

using namespace std;

int main(){

    int divident,divisor,quotient=0,remainder;

    cout<<"Enter divident: ";

    cin>>divident;

    cout<<"Enter divisor: ";

    cin>>divisor;

    if(divisor==0){

        cout<<"Division by zero is not possible";

        return 1;

    }

    remainder=divident;

    while(remainder >=divisor){

        remainder = divisor;

        quotient++;

    }

    cout<<"Quotient: "<<quotient;

    cout<<"Remainder: "<<remainder;

    return 0;

}

// Q18. circular left and right shift of bits on a given integer and display result

#include <iostream>

using namespace std;

int main() {

    int num,shift,bits;

    cout<<"Enter an integer: ";

    cin>>num;

    cout<<"Enter number of shifts: ";

    cin>>shift;

    bits = sizeof(num) \* 8;

    int leftShift = (num << shift) | (num >> (bits - shift));

    int rightShift = (num >> shift) | (num << (bits - shift));

    cout << "Circular Left Shift: " << leftShift << endl;

    cout << "Circular Right Shift: " << rightShift << endl;

    return 0;

}

// Q19. calculate grades of student based on marks (if-else or switch statement)

#include<iostream>

using namespace std;

int main(){

    int marks;

    cout<<"Enter marks of student: ";

    cin>>marks;

    if (marks>=90)

        cout<<"A Grade";

    else if (marks>=80)

        cout<<"B Grade";

    else if (marks>=70)

        cout<<"C Grade";

    else if (marks>=60)

        cout<<"D Grade";

    else if (marks>=50)

        cout<<"E Grade";

    else if (marks<=50)

        cout<<"F Grade";

    else

        cout<<"Invalid marks...";

    return 0;

}

// Q20. menu driven calculator

#include<iostream>

using namespace std;

int main(){

    int choice,num1,num2;

    while (true){

    cout<<"Enter two numbers: ";

    cin>>num1>>num2;

    cout<<"Enter 1 for addition\nEnter 2 for subtraction\nEnter 3 for multiplication\nEnter 4 for division\nEnter 5 to exit\n";

    cout<<"Enter your choice: ";

    cin>>choice;

    switch(choice){

        case 1:cout<<"Sum of the given two numbers is: "<<num1+num2<<endl;

            break;

        case 2: cout<<"Difference of the given two numbers is: "<<num1-num2<<endl;

            break;

        case 3:cout<<"Product of the given two numbers is: "<<num1+num2<<endl;

            break;

        case 4: cout<<"Difference of the given two numbers is: "<<num1-num2<<endl;

            break;

        case 5:break;

        default: cout<<"Invalid choice..."<<endl;

    }

    }

    return 0;

}

// Q21. leap year nested if-else

#include <iostream>

using namespace std;

int main() {

    int year;

    cout << "Enter a year: ";

    cin >> year;

    if (year % 4 == 0) {

        if (year % 100 == 0) {

            if (year % 400 == 0) {

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

            } else {

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

            }

        } else {

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

        }

    } else {

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

    }

    return 0;

}

// Q22. first n fibonacci no's using for loop

#include <iostream>

using namespace std;

int main() {

    int n;

    cout << "Enter the number of Fibonacci numbers (positive number): ";

    cin >> n;

    int a=0, b=1;

    cout << "Fibonacci Series: ";

    for (int i = 1; i <= n; i++) {

        if (i == 1) {

            cout << a << " ";

        }

        else if (i == 2) {

            cout <<b << " ";

        }

        else {

            int next = a + b;

            cout << next << " ";

            a = b;

            b = next;

        }

    }

    return 0;

}

// Q23. no is prime using while loop

#include<iostream>

using namespace std;

int main(){

    int n,div=2;

    cout<<"Enter the number: ";

    cin>>n;

    while (div<n){

        if(n%div == 0){

            cout<<"The given number is not prime.";

            break;

        }

        else{

            cout<<"The given number is a prime number.";

            div+=1;

        }

    }

    return 0;

}

// Q24. factorial using do-while

#include <iostream>

using namespace std;

int main() {

    int num;

    int factorial = 1;

    cout << "Enter a non-negative integer: ";

    cin >> num;

    int i = 1;

    do {

        factorial \*= i;

        i++;

    } while (i <= num);

    cout << "Factorial of " << num << " is: " << factorial << endl;

    return 0;

}

// Q25. continuously accepts user input of integers until user types exit at the end display sum, count no of valid integers, min and max number

#include <iostream>

using namespace std;

int main() {

    string input;

    int sum = 0, count = 0, num;

    int minNum, maxNum;

    bool firstInput = true;

    cout << "Enter integers (type 'exit' to finish):" << endl;

    while (true) {

        cout << "Enter a number: ";

        cin >> input;

        if (input == "exit") {

            break;

        }

        bool isValid = true;

        for (int i = 0; input[i] != '\0'; i++) {

            if ((i == 0 && input[i] == '-') || (input[i] >= '0' && input[i] <= '9')) {

                continue;

            } else {

                isValid = false;

                break;

            }

        }

        if (!isValid) {

            cout << "Invalid input! Please enter a valid integer or 'exit' to stop." << endl;

            continue;

        }

        num = 0;

        int sign = 1;

        int start = 0;

        if (input[0] == '-') {

            sign = -1;

            start = 1;

        }

        for (int i = start; input[i] != '\0'; i++) {

            num = num \* 10 + (input[i] - '0');

        }

        num \*= sign;

        sum += num;

        count++;

        if (firstInput) {

            minNum = maxNum = num;

            firstInput = false;

        } else {

            if (num < minNum) minNum = num;

            if (num > maxNum) maxNum = num;

        }

    }

    if (count > 0) {

        cout << "\nResults:" << endl;

        cout << "Sum: " << sum << endl;

        cout << "Count: " << count << endl;

        cout << "Minimum: " << minNum << endl;

        cout << "Maximum: " << maxNum << endl;

    } else {

        cout << "No valid numbers were entered." << endl;

    }

    return 0;

}