

DSA Assignment

1. Average of three integers

```
#include <iostream>
using namespace std;

int main() {
    int a, b, c;
    cout << "Enter three integers: ";
    cin >> a >> b >> c;
    double average = (a + b + c) / 3.0;
    cout << "Average: " << average << endl;
    return 0;
}
```

2. Circumference of a circle

```
#include <iostream>
using namespace std;

int main() {
    double radius;
    cout << "Enter radius of circle: ";
    cin >> radius;
    double circumference = 2 * 3.14159 * radius;
    cout << "Circumference: " << circumference << endl;
    return 0;
}
```

3. Simple Interest

```
#include <iostream>
using namespace std;

int main() {
    double principal, rate, time;
    cout << "Enter principal, rate (%), and time (years): ";
    cin >> principal >> rate >> time;
    double interest = (principal * rate * time) / 100;
    cout << "Simple Interest: " << interest << endl;
    return 0;
}
```

4. Volume of a cuboid

```
#include <iostream>
using namespace std;

int main() {
    double length, width, height;
    cout << "Enter length, width, and height: ";
    cin >> length >> width >> height;
    double volume = length * width * height;
    cout << "Volume: " << volume << endl;
    return 0;
}
```

5. Profit or loss on selling 25 bananas

```
#include <iostream>
using namespace std;

int main() {
    double costPerDozen, sellingPerDozen;
    cout << "Enter cost price per dozen: ";
    cin >> costPerDozen;
    cout << "Enter selling price per dozen: ";
    cin >> sellingPerDozen;

    double cost25 = (25.0 / 12) * costPerDozen;
    double sell25 = (25.0 / 12) * sellingPerDozen;
    double profitOrLoss = sell25 - cost25;

    if (profitOrLoss > 0)
        cout << "Profit: " << profitOrLoss << endl;
    else if (profitOrLoss < 0)
        cout << "Loss: " << -profitOrLoss << endl;
    else
        cout << "No profit, no loss." << endl;

    return 0;
}
```

6. Input character and print ASCII

```
#include <iostream>
using namespace std;

int main() {
```

```
char ch;
cout << "Enter a character: ";
cin >> ch;
cout << "ASCII code: " << int(ch) << endl;
return 0;
}
```

7. Input ASCII code and print character

```
#include <iostream>
using namespace std;

int main() {
int code;
cout << "Enter ASCII code: ";
cin >> code;
cout << "Character: " << char(code) << endl;
return 0;
}
```

8. Input three characters and print ASCII codes

```
#include <iostream>
using namespace std;

int main() {
char ch1, ch2, ch3;
cout << "Enter three characters: ";
cin >> ch1 >> ch2 >> ch3;
cout << ch1 << " -> " << int(ch1) << endl;
cout << ch2 << " -> " << int(ch2) << endl;
cout << ch3 << " -> " << int(ch3) << endl;
return 0;
}
```

9. Convert date format

```
#include <iostream>
using namespace std;

int main() {
string date;
cout << "Enter date (DD/MM/YYYY): ";
cin >> date;
```

```

string day = date.substr(0,2);
string month = date.substr(3,2);
string year = date.substr(6,4);

cout << "Day – " << day << ", Month – " << month << ", Year – " << year << endl;
return 0;
}

```

10. Convert time format

```

#include <iostream>
using namespace std;

int main() {
string time;
cout << "Enter time (HH:MM): ";
cin >> time;

string hour = time.substr(0,2);
string minute = time.substr(3,2);

cout << "Hour: " << hour << ", Minute: " << minute << endl;
return 0;
}

```

11. Input three characters and display ASCII codes (conditional statements)

```

#include <iostream>
using namespace std;

int main() {
char ch1, ch2, ch3;
cout << "Enter three characters: ";
cin >> ch1 >> ch2 >> ch3;
cout << ch1 << " -> " << int(ch1) << endl;
cout << ch2 << " -> " << int(ch2) << endl;
cout << ch3 << " -> " << int(ch3) << endl;
return 0;
}

```

12. Classify age groups

```

#include <iostream>
using namespace std;

```

```
int main() {
int age;
cout << "Enter age: ";
cin >> age;

if(age >= 0 && age <= 12)
cout << "Child" << endl;
else if(age <= 19)
cout << "Teenager" << endl;
else if(age <= 59)
cout << "Adult" << endl;
else
cout << "Senior" << endl;

return 0;
}
```

13. Grade based on score

```
#include <iostream>
using namespace std;

int main() {
int score;
cout << "Enter score (0-100): ";
cin >> score;

if(score >= 90)
cout << "Grade: A" << endl;
else if(score >= 80)
cout << "Grade: B" << endl;
else if(score >= 70)
cout << "Grade: C" << endl;
else if(score >= 60)
cout << "Grade: D" << endl;
else
cout << "Grade: F" << endl;

return 0;
}
```

14. Check divisibility

```

#include <iostream>
using namespace std;

int main() {
int a, b;
cout << "Enter two integers: ";
cin >> a >> b;

if(b != 0 && a % b == 0)
cout << a << " is divisible by " << b << endl;
else
cout << a << " is not divisible by " << b << endl;

return 0;
}

```

15. Triangle type

```

#include <iostream>
using namespace std;

int main() {
int a, b, c;
cout << "Enter three sides of a triangle: ";
cin >> a >> b >> c;

if(a == b && b == c)
cout << "Equilateral triangle" << endl;
else if(a == b || b == c || a == c)
cout << "Isosceles triangle" << endl;
else
cout << "Scalene triangle" << endl;

return 0;
}

```

16. Temperature conversion

```

#include <iostream>
using namespace std;

int main() {
char type;
double temp;

```

```

cout << "Enter 'C' to convert to Celsius or 'F' to convert to Fahrenheit: ";
cin >> type;
cout << "Enter temperature: ";
cin >> temp;

if(type == 'C' || type == 'c')
    cout << "Temperature in Celsius: " << (temp - 32) * 5 / 9 << endl;
else if(type == 'F' || type == 'f')
    cout << "Temperature in Fahrenheit: " << (temp * 9 / 5) + 32 << endl;
else
    cout << "Invalid choice" << endl;

return 0;
}

```

17. Leap years in a range

```

#include <iostream>
using namespace std;

int main() {
    int start, end;
    cout << "Enter start and end year: ";
    cin >> start >> end;

    for(int year = start; year <= end; year++){
        if((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0))
            cout << year << " ";
        }
    cout << endl;
    return 0;
}

```

18. Middle (second largest) number

```

#include <iostream>
using namespace std;

int main() {
    int a, b, c;
    cout << "Enter three numbers: ";
    cin >> a >> b >> c;

    if((a > b && a < c) || (a > c && a < b)) cout << "Middle: " << a << endl;
}

```

```

else if((b > a && b < c) || (b > c && b < a)) cout << "Middle: " << b << endl;
else cout << "Middle: " << c << endl;

return 0;
}

```

19. Number of days in a month

```

#include <iostream>
using namespace std;

int main() {
    int month, year;
    cout << "Enter month (1-12) and year: ";
    cin >> month >> year;

    int days;
    if(month == 2){
        if((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0))
            days = 29;
        else
            days = 28;
    }
    else if(month == 4 || month == 6 || month == 9 || month == 11)
        days = 30;
    else
        days = 31;

    cout << "Number of days: " << days << endl;
    return 0;
}

```

20. Largest of four numbers

```

#include <iostream>
using namespace std;

int main() {
    int a, b, c, d;
    cout << "Enter four numbers: ";
    cin >> a >> b >> c >> d;

    int largest = a;
    if(b > largest) largest = b;

```



```
if(c > largest) largest = c;
if(d > largest) largest = d;

cout << "Largest: " << largest << endl;
return 0;
}
```

21. Day of the week

```
#include <iostream>
using namespace std;

int main() {
    int n;
    cout << "Enter a number (1-7): ";
    cin >> n;

    switch(n){
        case 1: cout << "Sunday"; break;
        case 2: cout << "Monday"; break;
        case 3: cout << "Tuesday"; break;
        case 4: cout << "Wednesday"; break;
        case 5: cout << "Thursday"; break;
        case 6: cout << "Friday"; break;
        case 7: cout << "Saturday"; break;
        default: cout << "Invalid number";
    }
    cout << endl;
    return 0;
}
```

22. Sum of first N natural numbers

```
#include <iostream>
using namespace std;

int main() {
    int N, sum = 0;
    cout << "Enter N: ";
    cin >> N;

    for(int i = 1; i <= N; i++)
        sum += i;
}
```

```
cout << "Sum: " << sum << endl;
return 0;
}
```

23. Sum of first N even natural numbers

```
#include <iostream>
using namespace std;
```

```
int main() {
int N, sum = 0;
cout << "Enter N: ";
cin >> N;
```

```
for(int i = 1; i <= N; i++)
sum += 2*i;
```

```
cout << "Sum of first " << N << " even numbers: " << sum << endl;
return 0;
}
```

24. Sum of first N odd natural numbers

```
#include <iostream>
using namespace std;
```

```
int main() {
int N, sum = 0;
cout << "Enter N: ";
cin >> N;
```

```
for(int i = 0; i < N; i++)
sum += 2*i + 1;
```

```
cout << "Sum of first " << N << " odd numbers: " << sum << endl;
return 0;
}
```

25. Sum of squares of first N natural numbers

```
#include <iostream>
using namespace std;
```

```
int main() {
```

```

int N, sum = 0;
cout << "Enter N: ";
cin >> N;

for(int i = 1; i <= N; i++)
    sum += i*i;

cout << "Sum of squares: " << sum << endl;
return 0;
}

```

26. Sum of cubes of first N natural numbers

```

#include <iostream>
using namespace std;

int main() {
    int N, sum = 0;
    cout << "Enter N: ";
    cin >> N;

    for(int i = 1; i <= N; i++)
        sum += i*i*i;

    cout << "Sum of cubes: " << sum << endl;
    return 0;
}

```

27. Factorial of a number

```

#include <iostream>
using namespace std;

int main() {
    int n;
    unsigned long long fact = 1;
    cout << "Enter number: ";
    cin >> n;

    for(int i = 1; i <= n; i++)
        fact *= i;

    cout << "Factorial: " << fact << endl;
    return 0;
}

```

```
}
```

28. Count digits in a number

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
int num, count = 0;
```

```
cout << "Enter number: ";
```

```
cin >> num;
```

```
if(num == 0) count = 1;
```

```
while(num != 0) {
```

```
num /= 10;
```

```
count++;
```

```
}
```

```
cout << "Number of digits: " << count << endl;
```

```
return 0;
```

```
}
```

29. Check prime number

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
int num, flag = 0;
```

```
cout << "Enter number: ";
```

```
cin >> num;
```

```
if(num <= 1) flag = 1;
```

```
for(int i = 2; i*i <= num; i++){
```

```
if(num % i == 0){
```

```
flag = 1;
```

```
break;
```

```
}
```

```
}
```

```
if(flag == 0) cout << num << " is prime" << endl;
```

```
else cout << num << " is not prime" << endl;
```

```
return 0;
```

```
}
```

30. LCM of two numbers

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
int a, b, max;
```

```
cout << "Enter two numbers: ";
```

```
cin >> a >> b;
```

```
max = (a > b) ? a : b;
```

```
while(true) {
```

```
if(max % a == 0 && max % b == 0)
```

```
break;
```

```
max++;
```

```
}
```

```
cout << "LCM: " << max << endl;
```

```
return 0;
```

```
}
```

31. Reverse a number

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
int num, rev = 0;
```

```
cout << "Enter number: ";
```

```
cin >> num;
```

```
while(num != 0) {
```

```
rev = rev*10 + num%10;
```

```
num /= 10;
```

```
}
```

```
cout << "Reversed number: " << rev << endl;
```

```
return 0;
```

```
}
```

32. Find Nth term of Fibonacci series

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {  
    int N;  
    cout << "Enter N: ";  
    cin >> N;  
  
    int a = 0, b = 1, c;  
    if(N == 1) cout << "Nth term: " << a << endl;  
    else if(N == 2) cout << "Nth term: " << b << endl;  
    else {  
        for(int i = 3; i <= N; i++){  
            c = a + b;  
            a = b;  
            b = c;  
        }  
        cout << "Nth term: " << b << endl;  
    }  
  
    return 0;  
}
```

33. First N terms of Fibonacci series

```
#include <iostream>  
using namespace std;
```

```
int main() {  
    int N;  
    cout << "Enter N: ";  
    cin >> N;  
  
    int a = 0, b = 1, c;  
    cout << a << " " << b << " ";  
    for(int i = 3; i <= N; i++){  
        c = a + b;  
        cout << c << " ";  
        a = b;  
        b = c;  
    }  
    cout << endl;  
    return 0;  
}
```

34. Check if number is in Fibonacci series

```
#include <iostream>
using namespace std;

int main() {
    int num;
    cout << "Enter number: ";
    cin >> num;

    int a = 0, b = 1, c = a + b;
    if(num == 0 || num == 1) cout << "Yes, in Fibonacci series" << endl;
    else {
        while(c < num){
            a = b;
            b = c;
            c = a + b;
        }
        if(c == num) cout << "Yes, in Fibonacci series" << endl;
        else cout << "No, not in Fibonacci series" << endl;
    }
    return 0;
}
```

35. HCF of two numbers

```
#include <iostream>
using namespace std;

int main() {
    int a, b;
    cout << "Enter two numbers: ";
    cin >> a >> b;

    while(b != 0){
        int temp = b;
        b = a % b;
        a = temp;
    }

    cout << "HCF: " << a << endl;
    return 0;
}
```

36. Check co-prime numbers

```
#include <iostream>
using namespace std;

int main() {
    int a, b;
    cout << "Enter two numbers: ";
    cin >> a >> b;

    int x = a, y = b;
    while(y != 0){
        int temp = y;
        y = x % y;
        x = temp;
    }

    if(x == 1) cout << "Co-prime numbers" << endl;
    else cout << "Not co-prime" << endl;

    return 0;
}
```

37. Prime numbers under 100

```
#include <iostream>
using namespace std;

int main() {
    for(int num = 2; num < 100; num++){
        bool isPrime = true;
        for(int i = 2; i*i <= num; i++){
            if(num % i == 0){
                isPrime = false;
                break;
            }
        }
        if(isPrime) cout << num << " ";
    }
    cout << endl;
    return 0;
}
```


38. Prime numbers between two numbers

```
#include <iostream>
using namespace std;

int main() {
    int start, end;
    cout << "Enter start and end: ";
    cin >> start >> end;

    for(int num = start; num <= end; num++){
        if(num < 2) continue;
        bool isPrime = true;
        for(int i = 2; i*i <= num; i++){
            if(num % i == 0){
                isPrime = false;
                break;
            }
        }
        if(isPrime) cout << num << " ";
    }
    cout << endl;
    return 0;
}
```

39. Next prime number

```
#include <iostream>
using namespace std;

int main() {
    int num;
    cout << "Enter number: ";
    cin >> num;
    num++;

    while(true){
        bool isPrime = true;
        for(int i = 2; i*i <= num; i++){
            if(num % i == 0){
                isPrime = false;
                break;
            }
        }
    }
}
```

```
if(isPrime) break;
num++;
}

cout << "Next prime number: " << num << endl;
return 0;
}
```

40. Check Armstrong number

```
#include <iostream>
#include <cmath>
using namespace std;

int main() {
    int num, original, sum = 0, digits = 0;
    cout << "Enter number: ";
    cin >> num;
    original = num;

    int temp = num;
    while(temp != 0){
        temp /= 10;
        digits++;
    }

    temp = num;
    while(temp != 0){
        int digit = temp % 10;
        sum += pow(digit, digits);
        temp /= 10;
    }

    if(sum == original) cout << "Armstrong number" << endl;
    else cout << "Not an Armstrong number" << endl;

    return 0;
}
```

41. Armstrong numbers under N

```
#include <iostream>
#include <cmath>
using namespace std;
```

```
int main() {
int N;
cout << "Enter upper limit: ";
cin >> N;

for(int num = 1; num < N; num++){
int temp = num, sum = 0, digits = 0;
while(temp != 0){
temp /= 10;
digits++;
}

temp = num;
while(temp != 0){
int digit = temp % 10;
sum += pow(digit, digits);
temp /= 10;
}

if(sum == num)
cout << num << " ";
}
cout << endl;
return 0;
}
```