

1. Write a C++ program to print a - z using a loop.

'a'  $\xrightarrow[\text{value}]{\text{decimal}}$  97      ASCII table

'z'  $\xrightarrow[\text{value}]{\text{decimal}}$  122      "      "

'a'  $\rightarrow$  97      i = 97

'b'  $\rightarrow$  98

'c'  $\rightarrow$  99

⋮

'z'  $\rightarrow$  122      i = 122

A  
⋮  
Z

a  
⋮  
z

① char letter = 'a';

int i = (int) letter; // i = 97

i++ ..... i <= 122

~~for~~ for (int i = (int) letter; i <= 122; i++)  
{  
    cout << (char) i << endl;

}  
~~while~~ while (letter != 'z')  
{  
    cout << letter << endl;  
    letter++;  
    letter++;  
}

letter = 'a'

letter++;  $\rightarrow$  'b'

'c'

⋮

2. Write a C++ program to continue taking integer inputs from the user until the user gives 0. Your program should compute and display the count of positive and negative numbers entered.

```
int number, positive Count=0, negative Count=0;
```

```
while (true)  
{
```

```
    cin >> number;
```

```
    // loop terminating condition
```

```
    if (number == 0)  
        break;
```

```
    if (number > 0) // positive
```

```
        positive Count ← positive Count + 1
```

```
    if (number < 0) // negative
```

```
        negative Count ← negative Count + 1
```

```
}
```

variable

number → (int)

positive Count (int)

negative Count (int)

3. Write a C++ program that takes a positive integer input (e.g., n) from the user through the keyboard and computes the sum from 1 to n.

$i \leftarrow 1$  ~~~~~  $i \leftarrow n$       variables

Sum : 0

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

Sum  $\leftarrow$  Sum + i;

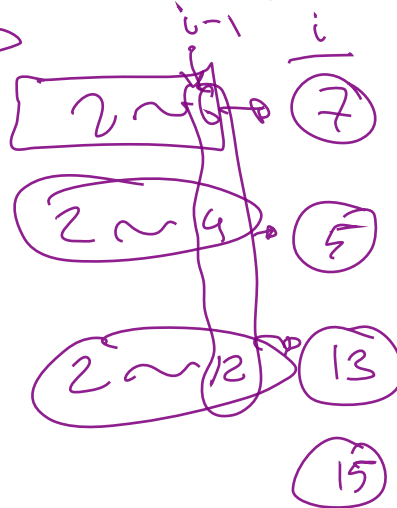
$$n = 10 \Rightarrow 2\ 3\ 5\ 7$$

4. Write a C++ program that takes a positive integer input (e.g.,  $n$  where  $n > 3$ ) from the user through the keyboard and displays all the prime numbers from 2 to  $n$ .

```

for (int i = 2; i <= n; i++)
{
    bool flag = true;
    for (int j = 2; j <= i-1; j++)
    {
        if (i % j == 0)
        {
            flag = false;
            break;
        }
    }
    if (flag)
        cout << i << " ";
}

```



5. Write a C++ program that takes a positive integer number and computes the sum of all the digits using a loop.

Example: 82549  $\rightarrow 8 + 2 + 5 + 4 + 9 = 28$ ; 8888  $\rightarrow 8 + 8 + 8 + 8 = 32$ ;  
 2,147,483,648  $\Rightarrow 2+1+4+7+4+8+3+6+4+8 = 47$

82549  
 n. ① 82549 % 10  
 - 8254 82549 / 10  
 ② 8254 % 10  
 - 825 8254 / 10

```
int number, sum = 0, digit;
while (number != 0)
{
    digit = number % 10;
    sum = sum + digit;
    number = number / 10;
}
```

6. Write a program to print out all Armstrong numbers between 1 and 500. If the sum of cubes of each digit of the number is equal to the number itself, then the number is called an Armstrong number. For example,  $153 = (1 * 1 * 1) + (5 * 5 * 5) + (3 * 3 * 3)$