# **Lab 5. Loops in C++**

***Q1. Create a menu that displays at start “LAB 5” and give options to the user to run a program of his/her own choice i.e, if user enters 2 then run question 2, if user enter 3 run question 3, if user enter 4 run question 4 and so on. Write code in q1 function, to calculate the sum of the first n natural numbers using a loop.***

| int main() {  int option;  std::cout << "Enter option: ";  std::cin >> option;  switch (option) {  case 1:  q1();  break;  case 2:  q2();  break;  case 3:  q3();  break;  default:  cout << "Invalid option. Exiting." << std::endl;  break;  }  return 0;  } |
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***Q2. Write a function to display all prime numbers within a given range. Utilize loops and if-else statements to identify and display the prime numbers.***

| bool isPrime(int num)  { if (num <= 1)  { return false;  }  for (int i = 2; i \* i <= num; ++i)  { if (num % i == 0)  return false;  }  return true;  }  void q2(int start, int end)  {  start = max(start, 2);  for (int i = start; i <= end; ++i)  {  if (isPrime(i))  std::cout << i << " ";  }  std::cout << std::endl;  } |
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***Q3. Write a function that prints the given pattern using a for loop.***

**1 2**

**1 2 3**

**1 2 3 4**

**1 2 3 4 5**

| void q3()  {  for (int i = 1; i <= 5; ++i)  {  for (int j = 1; j <= i; ++j)  {  cout << j << " ";  }  cout << endl;  }  } |
| --- |

***Q4. Write a function displaying all factors of a number entered by the user using a for loop.***

***For example if a user enters 15 then output should be: 1 ,3,5 and 15.***

| void displayFact()  {  Int number;  cin>>number;  cout << "Factors of " << number << ": ";  for (int i = 1; i <= number; ++i)  {  if (number % i == 0)  {  cout << i << " ";  }  }  cout << endl;  } |
| --- |

***Q5. Write a function that calculates the sum of digits of a given integer using a while loop.***

***For example if input is 12345 then output will be 15.***

| int sumOfDigits()  { int sum = 0,number;  while (number != 0)  {  sum += number % 10;  number /= 10;  }  return sum;  } |
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