

FUNDAMENTALS OF PROGRAMMING

ASSIGNMENT # 01

ABDUL MOIZ 464834 SECTION B

1. Write a C++ program to display factors of a number using for loops.

{// Question # 1

```
int num, n1;
```

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

```
cin >> num;
```

```
cout << "Factors of number " << num << " are :";
```

```
for (int j = 1; j <= 1; j++)
```

```
{
```

```
for (int i = 1; i <= num; i++)
```

```
{
```

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

```
{
```

```
continue;
```

```
}
```

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

```
{
```

```
cout<<setw(3) << i;
```

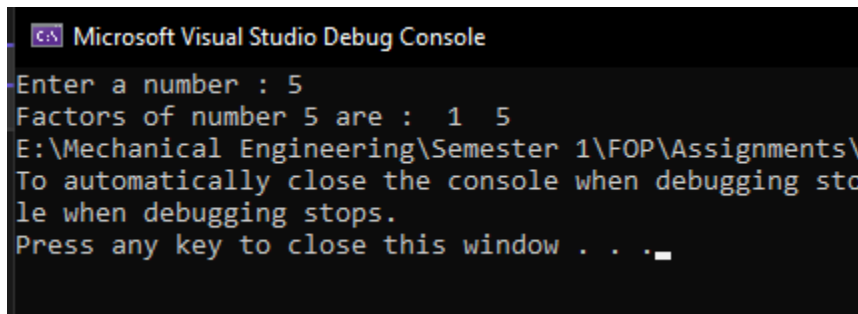
```
}
```

```
}
```

```

}
return 0;
}

```



The screenshot shows the Microsoft Visual Studio Debug Console with the following text:

```

Enter a number : 5
Factors of number 5 are : 1 5
E:\Mechanical Engineering\Semester 1\FOP\Assignments\
To automatically close the console when debugging stops
le when debugging stops.
Press any key to close this window . . .

```

2. Write output to the following code.

```

{ int x = 5;
  int y = 10;
  if (x == 5) if (y == 10)
    std::cout << "x is 5 and y is 10" << std::endl;
  else std::cout << "x is not 5" << std::endl;
  return 0; }

```

OUTPUT

x is 5 and y is 10

3. Write a C++ program, take an integer value from user and check if it's greater than 10 and less than equal to 20. Print 1 if yes and print 0 if no. Use appropriate datatype for output.

```

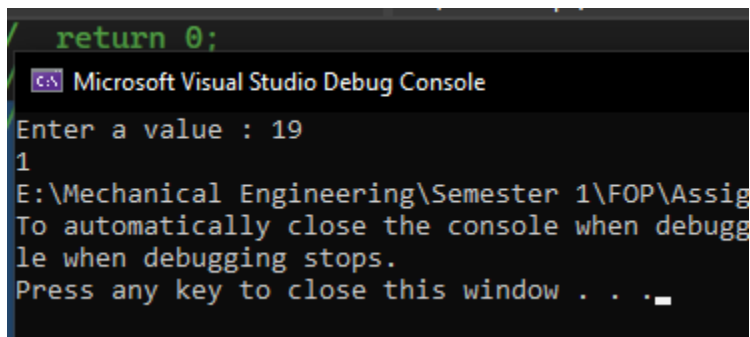
{// Question # 3
int val,x=0,y=1;
cout << "Enter a value : ";

```

```

cin >> val;
if (val > 10 && val <= 20)
{
    cout << ++x;
}
else
{
    cout << --y;
}
return 0;
}

```



```

/ return 0;
Microsoft Visual Studio Debug Console
Enter a value : 19
1
E:\Mechanical Engineering\Semester 1\FOP\Assignments\
To automatically close the console when debugging
le when debugging stops.
Press any key to close this window . . .

```

4. Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N. Your program should take the value of N as input from the user and then find the largest prime number less than or equal to N. You are not allowed to use any library or pre-existing functions to check for prime numbers.

```
{ // Question # 4
```

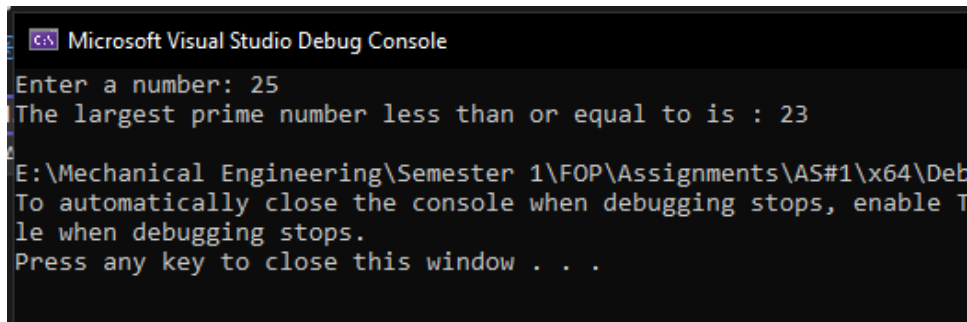
```
int N, check;
```

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

```
cin >> N;
while (N >= 2)
{
    check = 0;
    for (int j = 1; j <= N; ++j)
    {
        if (N % j == 0)
        {
            check++;
        }
    }
    if (check == 2)
    {
        cout << "The largest prime number less than or equal to is : " << N <<
endl;
        break;
    }
    else
    {
        --N;
    }
}
```

```
return 0;
```

```
}
```

A screenshot of the Microsoft Visual Studio Debug Console window. The title bar reads "Microsoft Visual Studio Debug Console". The console output shows: "Enter a number: 25", "The largest prime number less than or equal to is : 23", and a file path "E:\Mechanical Engineering\Semester 1\FOP\Assignments\AS#1\x64\Deb". Below the file path, there is a message: "To automatically close the console when debugging stops, enable T" and "le when debugging stops." followed by "Press any key to close this window . . .".

```
Microsoft Visual Studio Debug Console
Enter a number: 25
The largest prime number less than or equal to is : 23
E:\Mechanical Engineering\Semester 1\FOP\Assignments\AS#1\x64\Deb
To automatically close the console when debugging stops, enable T
le when debugging stops.
Press any key to close this window . . .
```

5. Write a C++ program, take two string as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.

```
{ // Question # 5
```

```
string str1, str2, reverse;
```

```
reverse = "";
```

```
cout << "Enter 1st String: ";
```

```
cin >> str1;
```

```
cout << "Enter 2nd String: ";
```

```
cin >> str2;
```

```
if (str1 == str2) {
```

```
for (int i = 0; i < str1.length(); i++) {
```

```
reverse = str1[i] + reverse;
```

```
}
```

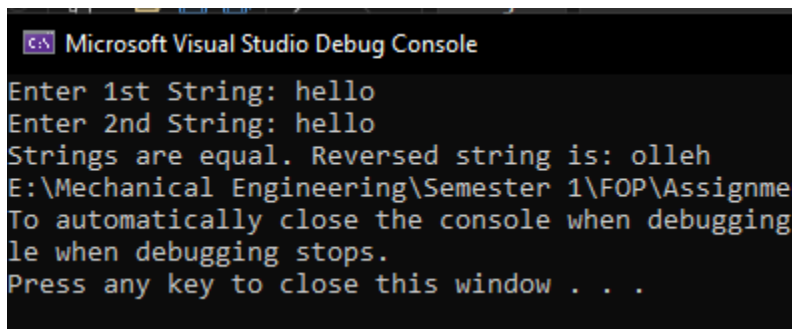
```
cout << "Strings are equal. Reversed string is: ";
```

```
cout << reverse;
```

```

}
else {
cout << "The Strings are not equal";
}
return 0;
}

```



The screenshot shows the Microsoft Visual Studio Debug Console with the following text:

```

Enter 1st String: hello
Enter 2nd String: hello
Strings are equal. Reversed string is: olleh
E:\Mechanical Engineering\Semester 1\FOP\Assignme
To automatically close the console when debugging
le when debugging stops.
Press any key to close this window . . .

```

6. Perform division in C++ without / using for loops. You can use / only to display the final results. Your dividend must be greater than divisor.

```
{ // Questin # 6
```

```

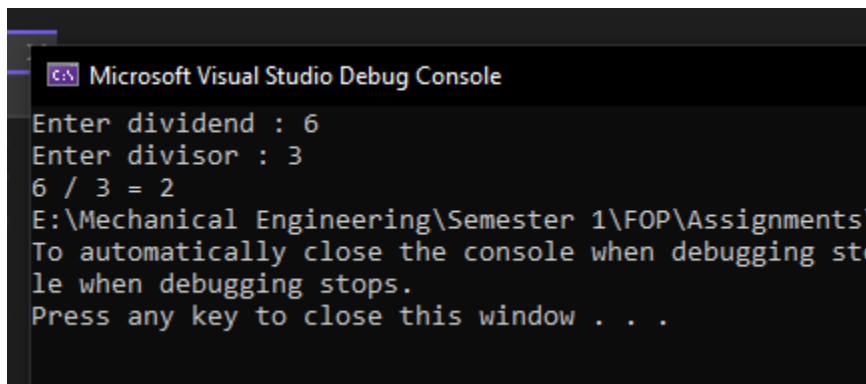
int divd, div, r, q;
cout << "Enter dividend : ";
cin >> divd;
cout << "Enter divisor : ";
cin >> div;
if (div>divd) {
cout << "Enter a dividend greater than divisor.";
return 1;
}

```

```

r = divd;
for (int i = 1; i <= divd; i++) {
r -= div;
if (div>r) {
q = i;
break;
}
}
cout << divd << " / " << div << " = " << q;
return 0;
}

```



```

Microsoft Visual Studio Debug Console
Enter dividend : 6
Enter divisor : 3
6 / 3 = 2
E:\Mechanical Engineering\Semester 1\FOP\Assignments
To automatically close the console when debugging stops,
press Ctrl+Shift+F5.
Press any key to close this window . . .

```

7. Write a C++program for a string which may contain lowercase and uppercase characters. The task is to remove all duplicate characters from the string and find the resultant string.

```
{ // Question # 7
```

```
string str1;
```

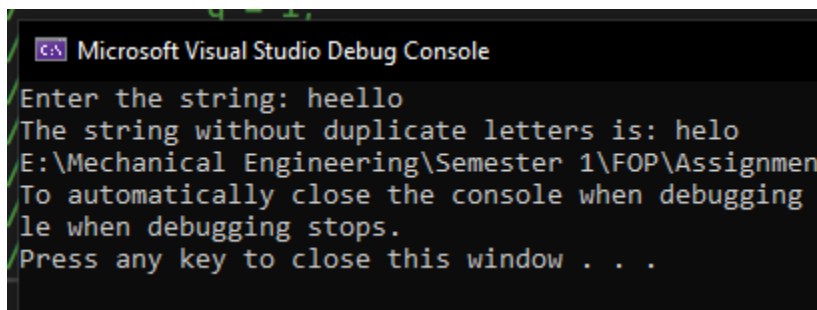
```
int length;
```

```

cout << "Enter the string: ";
getline(cin, str1);
length = str1.length();
for (int i = 0; i <= length; i++) {
    for (int j = 0; j <= length; j++) {
        if (tolower(str1[i]) == tolower(str1[j]) && i != j) {
            str1.erase(j, 1);
            j--;
            length = str1.length();
        }
    }
}

cout << "The string without duplicate letters is: " << str1;
return 0;
}

```



```

C:\> Microsoft Visual Studio Debug Console
Enter the string: heello
The string without duplicate letters is: helo
E:\Mechanical Engineering\Semester 1\FOP\Assignment...
To automatically close the console when debugging:
le when debugging stops.
Press any key to close this window . . .

```

8. Suppose an integer array $a[5] = \{1,2,3,4,5\}$. Add more elements to it and display them in C++.

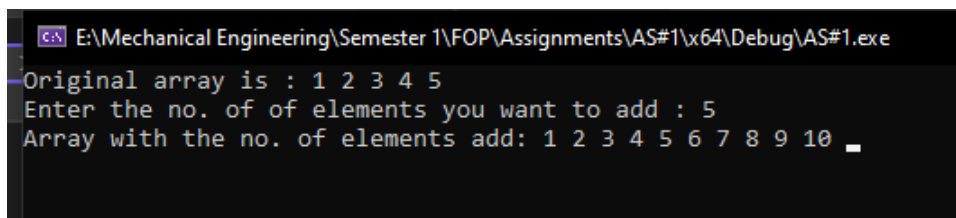
```
{ // Question # 8
```



```

int n, a[5] = { 1,2,3,4,5 };
cout << "Original array is : ";
for (int i = 0; i < 5; i++) {
    cout << a[i] << " ";
}
cout << endl;
cout << "Enter the no. of elements you want to add : ";
cin >> n;
for (int i = 5; i < 5 + n; i++) {
    a[i] = i + 1;
}
cout << "Array with the no. of elements add: ";
for (int i = 0; i < 5 + n; i++) {
    cout << a[i] << " ";
}
return 0;
}

```



The screenshot shows a Windows command prompt window with the title "E:\Mechanical Engineering\Semester 1\FOP\Assignments\AS#1\x64\Debug\AS#1.exe". The output of the program is displayed as follows:

```

Original array is : 1 2 3 4 5
Enter the no. of elements you want to add : 5
Array with the no. of elements add: 1 2 3 4 5 6 7 8 9 10 _

```

9. Given an integer array and an integer X. Find if there's a triplet in the array which sums up to the given integer X.

```
{ // Question # 9
int a, b, c, X, sum, arr[10];
cout << "Enter 10 integers : ";
for (int i = 0; i < 10; i++) {
cin >> arr[i];
}
bool found = false;
cout << "Enter integer for triplets : ";
cin >> X;
cout << "Triplets are : ";
for (int i = 0; i < 10; i++) {
for (int j = 0; j < 10; j++) {
if (i == j)
continue;
for (int z = 0; z < 10; z++) {
if (z == i || z == j)
continue;
sum = arr[i] + arr[j] + arr[z];
if (sum == X) {
cout << " (" << arr[i] << ", " << arr[j] << ", " << arr[z] << ")";
found = true;
}
}
```

```

}

}

}

if (found == false) {

cout << "No Triplets Found";

}

return 0;

}

```

```

Microsoft Visual Studio Debug Console
Enter 10 integers : 5
2
3
4
6
7
8
9
0
1
Enter integer for triplets : 5
Triplets are : (2, 3, 0) (2, 0, 3) (3, 2, 0) (3, 0, 2) (4, 0, 1) (4, 1, 0) (0, 2, 3) (0, 3, 2) (0, 4, 1) (0, 1, 4) (1, 4, 0) (1, 0, 4)
E:\Mechanical Engineering\Semester 1\FOP\Assignments\AS#1\Debug\AS#1.exe (process 4760) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .

```

10. Implement Bubble Sort on an array of 6 integers.

```

{ // Question # 10

int temp, x = 6, arr[6];

cout << "Enter six integers for array: ";

for (int i = 0; i < x; i++) {

cin >> arr[i];

}

for (int j = 0; j < (x - 1); j++) {

for (int i = 0; i < (x - 1); i++) {

if (arr[i] > arr[i + 1]) {

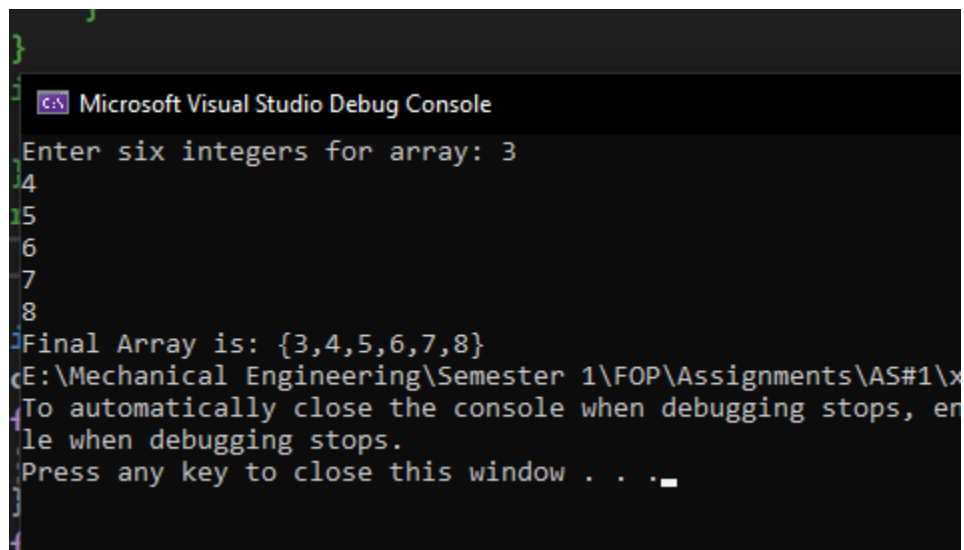
temp = arr[i];

```

```

arr[i] = arr[i + 1];
arr[i + 1] = temp;
}
}
}
cout << "Final Array is: {";
for (int i = 0; i < x; i++) {
cout << arr[i];
if (i == x - 1)
continue;
cout << ",";
}
cout << "}";
return 0;
}

```



The screenshot shows the Microsoft Visual Studio Debug Console with the following text:

```

Enter six integers for array: 3
4
5
6
7
8
Final Array is: {3,4,5,6,7,8}
E:\Mechanical Engineering\Semester 1\FOP\Assignments\AS#1\
To automatically close the console when debugging stops, en
le when debugging stops.
Press any key to close this window . . .

```