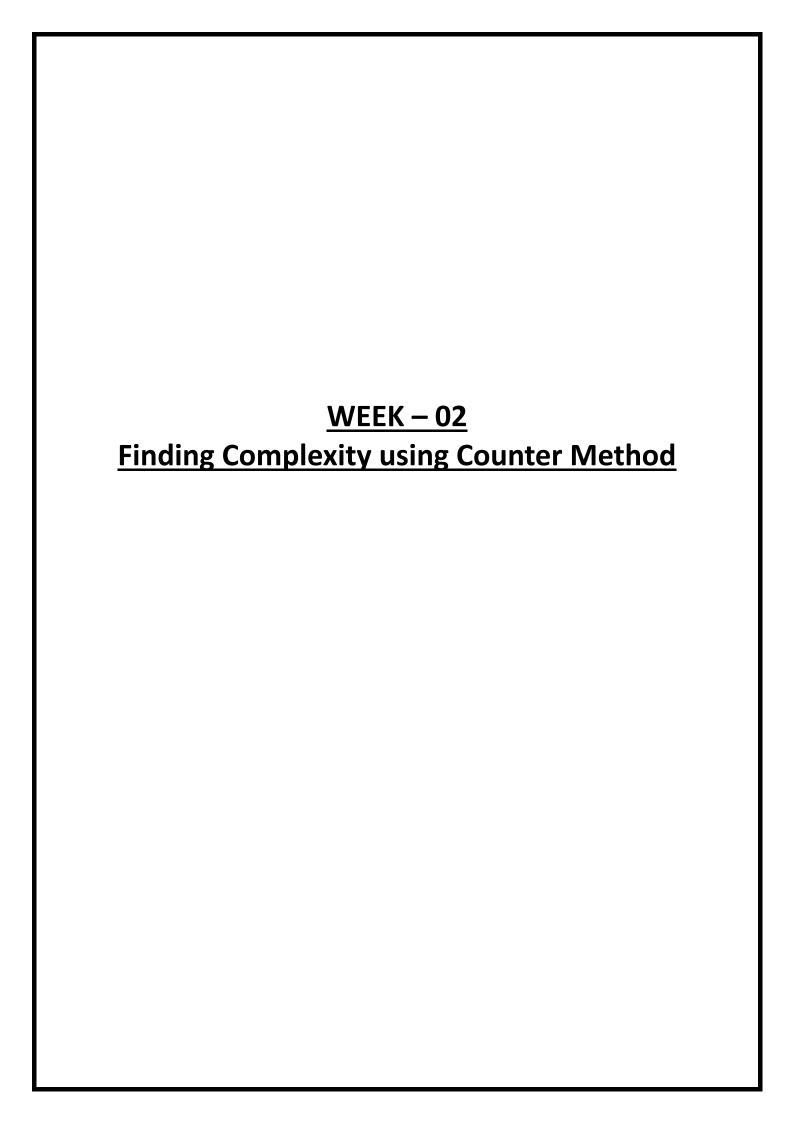# RAJALAKSHMI ENGINEERING COLLEGE
RAJALAKSHMI NAGAR, THANDALAM – 602 105

CS23331
DESIGN AND ANALYSIS OF ALGORITHM LAB

Laboratory Observation Note Book

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Year / Branch / Section : 2nd Year/ AIML / B

Register No. : 231501066

Semester : 3rd Semester

Academic Year : 2024-2025

WEEK – 02
Finding Complexity using Counter Method

1) Convert the following algorithm into a program and find its time complexity using the counter method.

```
void function (int n)
{
    int i= 1;
    int s =1;
    while(s <= n)
    {
        i++;
        s += i;
    }
}
```

Note: No need of counter increment for declarations and scanf() and count variable printf() statements.

Input:
 A positive Integer n
Output:
Print the value of the counter variable

For example:

Input	Result
9	12

<u>CODE:</u>

```
#include<stdio.h>
void function (int n)
{
    int c=0;
    int i= 1;
    c++;
    int s =1;
    c++;
```

```c
    while(s <= n)
    {
       c++;
        i++;
        c++;
        s += i;
        c++;
    }
    c++;
    printf("%d",c);
}
int main()
{
    int n;
    scanf("%d",&n);
    function(n);
}
```

OUTPUT:

	Input	Expected	Got	
✔	9	12	12	✔
✔	4	9	9	✔

Passed all tests! ✔

Correct
Marks for this submission: 1.00/1.00.

2) Convert the following algorithm into a program and find its time complexity using the counter method.
void func(int n)

```c
{
  if(n==1)
  {
    printf("*");
  }
  else
  {
    for(int i=1; i<=n; i++)
    {
      for(int j=1; j<=n; j++)
      {
        printf("*");
        printf("*");
        break;
      }
    }
  }
}
```

Note: No need of counter increment for declarations and scanf() and count variable printf() statements.
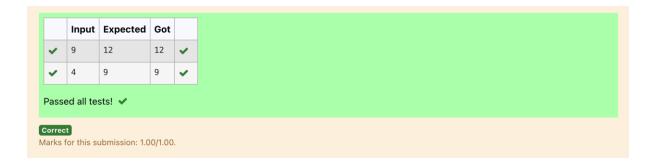Input:
 A positive Integer n
Output:
Print the value of the counter variable

CODE:
```c
#include <stdio.h>
void func(int n)
{
  int c=0;
  if(n==1)
  {
    c++;
    printf("*");
```

```c
     c++;
   }
   else
   {
    c++;
    for(int i=1; i<=n; i++)
    {
     c++;
     for(int j=1; j<=n; j++)
     {
       c++;
       //printf("*");
       c++;
       //printf("*");
       c++;
       break;
     }
     c++;
    }
    c++;
  }
  printf("%d",c);
}
int main()
{
   int n;
   scanf("%d",&n);
   func(n);
}
```

OUTPUT:

	Input	Expected	Got	
✔	2	12	12	✔
✔	1000	5002	5002	✔
✔	143	717	717	✔

Passed all tests! ✔

Correct
Marks for this submission: 1.00/1.00.

3) Convert the following algorithm into a program and find its time complexity using counter method.

```
Factor(num) {
{
  for (i = 1; i <= num;++i)
  {
   if (num % i== 0)
     {
       printf("%d ", i);
     }
   }
 }
```

Note: No need of counter increment for declarations and scanf() and counter variable printf() statement.

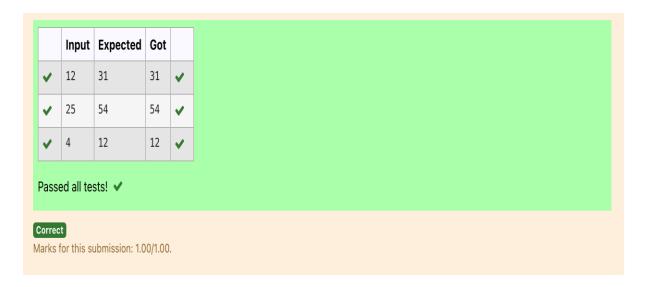**Input:**

A positive Integer n
Output:
Print the value of the counter variable

CODE:

```c
#include<stdio.h>
void Factor(int num)
 {
   int c=0,i;

   for (i = 1; i <= num;++i)
   {
     c++;
     c++;
     if (num % i== 0)
     {

       //printf("%d ", i);
       c++;
     }

   }
   c++;
   printf("%d",c);

}
int main()
{
   int num;
   scanf("%d",&num);
   Factor(num);
 }
```

OUPUT:

	Input	Expected	Got	
✔	12	31	31	✔
✔	25	54	54	✔
✔	4	12	12	✔

Passed all tests! ✔

4) Convert the following algorithm into a program and find its time complexity using counter method.

```
void function(int n)
{
   int c= 0;
   for(int i=n/2; i<n; i++)
     for(int j=1; j<n; j = 2 * j)
        for(int k=1; k<n; k = k * 2)
          c++;
}
```

Note: No need of counter increment for declarations and scanf() and count variable printf() statements.

Input:
 A positive Integer n
Output:
Print the value of the counter variable

CODE:

```c
#include<stdio.h>
void function(int n)
{
    int count=0;
    int c= 0;
    count++;
    for(int i=n/2; i<n; i++)
    {
        count++;
        for(int j=1; j<n; j = 2 * j)
        {
            count++;
            for(int k=1; k<n; k = k * 2)
            {
                count++;
                c++;
                count++;
            }
            count++;
        }
        count++;
    }
    count++;
    printf("%d",count);
}

int main()
{
    int n;
    scanf("%d",&n);
    function(n);
}
```

OUTPUT:

	Input	Expected	Got	
✔	4	30	30	✔
✔	10	212	212	✔

Passed all tests! ✔

Correct

Marks for this submission: 1.00/1.00.

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5) Convert the following algorithm into a program and find its time complexity using counter method.
```
void reverse(int n)
{
  int rev = 0, remainder;
  while (n != 0)
  {
     remainder = n % 10;
     rev = rev * 10 + remainder;
     n/= 10;

  }
print(rev);
}
```

Note: No need of counter increment for declarations and scanf() and count variable printf() statements.

Input:

A positive Integer n
Output:
Print the value of the counter variable

CODE:

```c
#include<stdio.h>
void reverse(int n)
{
    int count=0;
   int rev = 0, remainder;
   count++;
   while (n != 0)
    {
       count++;
       remainder = n % 10;
       count++;
       rev = rev * 10 + remainder;
       count++;
       n/= 10;
       count++;
    }
   count++;
   //printf("%d",rev);
   count++;
   printf("%d",count);
}

int main()
{
   int n;
   scanf("%d",&n);
   reverse(n);
}
```

OUTPUT:

	Input	Expected	Got	
✔	12	11	11	✔
✔	1234	19	19	✔

Passed all tests! ✔

Correct
Marks for this submission: 1.00/1.00.