RAJALAKSHMI ENGINEERING COLLEGE
RAJALAKSHMI NAGAR, THANDALAM – 602 105

RAJALAKSHMI
ENGINEERING COLLEGE

CS23331
DESIGN AND ANALYSIS OF ALGORITHM LAB

Laboratory Observation Note Book

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

Register No. : 231501028

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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:

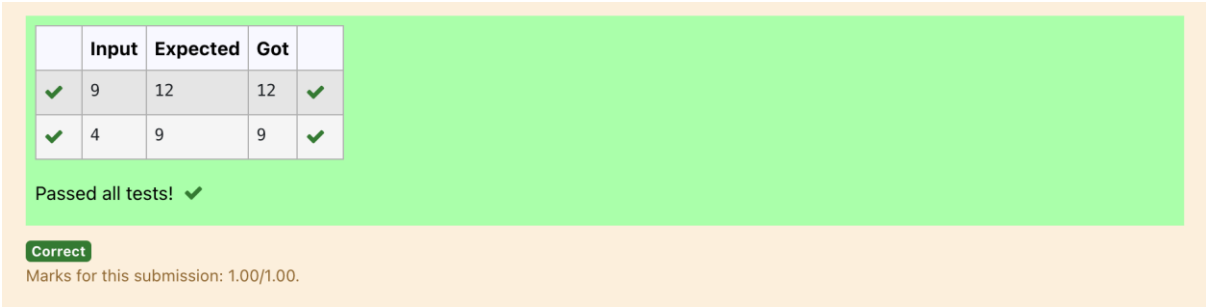
Input	Result
9	12

CODE:

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

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

```
#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! ✔

Correct

Marks for this submission: 1.00/1.00.

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:

```
#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.

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:

```
#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.