RAJALAKSHMIENGINEERINGCOLLEGE

RAJALAKSHMI NAGAR, THANDALAM – 602 105

RAJALAKSHMI
ENGINEERING COLLEGE

CS23331-DESIGNANDANALYSISOFALGORITHM

LABORATORYLABMANUAL

Name : GK GOKUL PRASATH

Year / Branch / Section : II YEAR / AIML / A

Register No. : 231501050

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REG.NO:231501050 **NAME: GK GOKUL PRASATH**

YEAR:IIYEAR **BRANCH:AIML** **SEC:A**

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WEEK01–BASICCPROGRAMS

EXPERIMENTNO: 1.1 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

SWAPPINGOFTWONUMBERS

GIVENTWONUMBERS,WRITEACPROGRAMTOSWAPTHENUMBERS.

FOREXAMPLE

Input	Result
10 20	20 10

PROGRAM

```
#include<stdio.h>in
t main()
{
int
a;intb;
int temp;
scanf("%d %d",&a,&b);
/*swapping the two
numbers*/temp=a;
a=b;b=t
emp;
printf("%d %d",a,b);
}
```

OUTPUT

	Input	Expected	Got	
✔	10 20	20 10	20 10	✔

Passed all tests! ✔

Correct

Marks for this submission: 1.00/1.00.

EXPERIMENTNO: 1.2 **DATE:**

REGISTERNO:231501050 **NAME:GK GOKUL PRASATH**

ELIGIBILITYCRITERIA

WRITEACPROGRAMTOFINDTHEELIGIBILITYOFADMISSIONFORAPROFESSIONALCOURSEBASEDONTHEFOLLOWINGCRITERIA:

MARKS IN MATHS >=

65MARKS IN PHYSICS >=

55MARKSINCHEMISTRY>=5

0OR

TOTALINALLTHREESUBJECTS>=180

SAMPLETESTCASES:T

ESTCASE1:

INPUT

706080

OUTPUT

THECANDIDATEISELIGIBLE

TESTCASE2:

INPUT

508080

OUTPUT

THECANDIDATEISELIGIBLE

TEST CASE

3INPUT

506040

OUTPUT

THECANDIDATEISNOTELIGIBLE

PROGRAM

```
#include<stdio.h>in

t main()

{
	int
	mark1;int
	mark2;int
	mark3;intt
	otal;
	scanf
	("%d	%d	%d",&mark1,&mark2,&mark3
	);total=mark1+mark2+mark3;

	if(mark1>=65 && mark2>=55 && mark3>=50 && total>=180)
	{
		printf("The candidate is eligible");
	}
	else if(total>=180)
	{
		printf("The candidate is eligible");
	}
	else{
```

OUTPUT

	Input	Expected	Got	
✔	70 60 80	The candidate is eligible	The candidate is eligible	✔
✔	50 80 80	The candidate is eligible	The candidate is eligible	✔

Passed all tests! ✔

EXPERIMENTNO: 1.3 **DATE:**

REGISTERNO:231501050 **NAME:GK GOKUL PRASATH**

GROCERYITEMS

MALINI GOES TO BESTSAVE HYPER MARKET TO BUY GROCERY ITEMS. BESTSAVEHYPERMARKETPROVIDES10%DISCOUNTONTHEBILLAMOUNTBWHENEVER THEBILLAMOUNTBISMORETHANRS.2000.

THEBILLAMOUNTBISPASSEDASTHEINPUTTOTHEPROGRAM.THEPROGRAMMUSTPRIN TTHEFINALAMOUNTAPAYABLEBYMALINI.

INPUTFORMAT:

THEFIRSTLINEDENOTESTHEVALUEOFB.

OUTPUTFORMAT:

THEFIRSTLINECONTAINSTHEVALUEOFTHEFINALPAYABLEAMOUNTA**.**

EXAMPLEINPUT/OUTPUT1:I

NPUT:

1900

OUTPUT:

1900

EXAMPLEINPUT/OUTPUT2:I

NPUT:

3000

OUTPUT:

2700

PROGRAM

```
#include<stdio.h>in
t main()
{
	int b;

	int discount;
	scanf("%d",&b);if(
	b>2000)
	{
		discount=b*0.10;

		printf("%d",b-discount);
	}
	else
	printf("%d",b);
}
```

OUTPUT

	Input	Expected	Got	
✔	1900	1900	1900	✔
✔	3000	2700	2700	✔

Passed all tests! ✔

EXPERIMENTNO: 1.4 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

BABA'SGIVINGPATTERN

BABA IS VERY KIND TO BEGGARS AND EVERY DAY BABA DONATES HALF OF THEAMOUNT HE HAS WHEN EVER A BEGGAR REQUESTS HIM. THE MONEY M LEFT IN BABA'SHAND IS PASSED AS THE INPUT AND THE NUMBER OF BEGGARS B WHO RECEIVED THEALMSAREPASSEDASTHEINPUT.THEPROGRAMMUSTPRINTTHEMONEYBABAHADINTHEBEGINNINGOFTHEDAY.

INPUTFORMAT:

THE FIRST LINE DENOTES THE VALUE OF M.THESECONDLINEDENOTESTHEVALUEOFB.

OUTPUTFORMAT:

THE FIRST LINE DENOTES THE VALUE OF MONEY WITH BABA IN THE BEGINNING OF THEDAY.

EXAMPLEINPUT/OUTPUT:

INPUT:

100
2

OUTPUT:

400

EXPLANATION:

Babadonatedtotwobeggars.Sowhenheencounteredsecondbeggarhehad100*2= Rs.200andwhenheencountered1sthehad200*2=Rs.400.

PROGRAM

```
#include<stdio.h>in
t main()
{
        int
        money;int
        beggar;inta
        mount;
        scanf("%d %d",&money,&beggar);

        amount=money*beggar*
        2;printf("%d",amount);
}
```

OUTPUT

	Input	Expected	Got	
✔	100 2	400	400	✔

Passed all tests! ✔

Correct

Marks for this submission: 1.00/1.00.

EXPERIMENTNO: 1.5 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PUNCTUALITYINCENTIVE

THECEOOFCOMPANYABCINCWANTEDTOENCOURAGETHEEMPLOYEESCOMINGON TIME TO THE OFFICE. SO HE ANNOUNCED THAT FOR EVERY CONSECUTIVE DAYAN EMPLOYEE COMES ON TIME IN A WEEK (STARTING FROM MONDAY TOSATURDAY), HE WILL BE AWARDED RS.200 MORE THAN THE PREVIOUS DAY AS"PUNCTUALITY INCENTIVE". THE INCENTIVE I FOR THE STARTING DAY (IE ONMONDAY) IS PASSED AS THE INPUT TO THE PROGRAM. THE NUMBER OF DAYS N ANEMPLOYEE CAME ON TIME CONSECUTIVELY STARTING FROM MONDAY IS ALSOPASSED AS THE INPUT. THE PROGRAM MUST CALCULATE AND PRINT THE"PUNCTUALITYINCENTIVE"POFTHEEMPLOYEE.

INPUTFORMAT:

THE FIRST LINE DENOTES THE VALUE OF I.THESECONDLINEDENOTESTHEVALUEOFN.

OUTPUTFORMAT:

THEFIRSTLINEDENOTESTHEVALUEOFP.

EXAMPLEINPUT/OUTPUT:

INPUT:

500
3

OUTPUT:

2100

EXPLANATION:

ONMONDAYTHEEMPLOYEERECEIVESRS.500,ONTUESDAYRS.700,ONWEDNESDAYRS.90 0

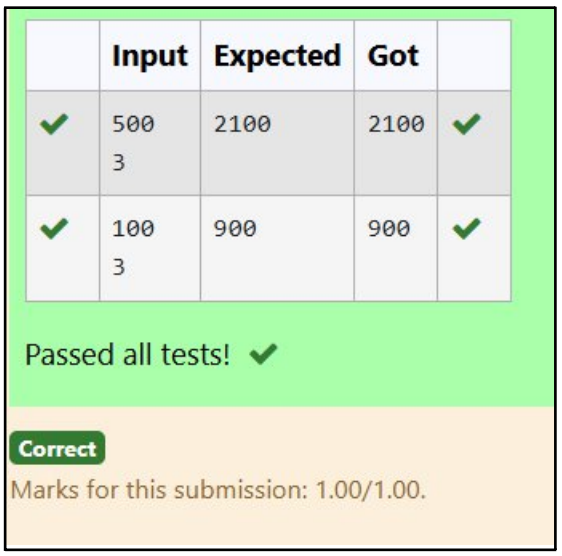
SOTOTAL=RS.2100

PROGRAM

```
#include<stdio.h>in
t main()
{
   int
   a,b,sum=0;scanf("
   %d",&a);
   scanf("%d",&b);
   for(int i=0;i<b;i++)
   {
         sum+=a;
         a=a+200;

   }
   printf("%d",sum);
}
```

OUTPUT



	Input	Expected	Got	
✔	500 3	2100	2100	✔
✔	100 3	900	900	✔

Passed all tests! ✔

Correct

Marks for this submission: 1.00/1.00.

EXPERIMENTNO: 1.6 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

DIVISIBILITYFINDER

TWONUMBERSMANDNAREPASSEDASTHEINPUT.ANUMBERXISALSOPASSEDASTHE INPUT. THE PROGRAM MUST PRINT THE NUMBERS DIVISIBLE BY X FROM N TO M(INCLUSIVEOFMANDN).

INPUTFORMAT:

THE FIRST LINE DENOTES THE VALUE OF
MTHESECONDLINEDENOTESTHEVALUEOFNT
HETHIRDLINEDENOTESTHEVALUEOFX

OUTPUTFORMAT:

NUMBERSDIVISIBLEBYXFROMNTOM,WITHEACHNUMBERSEPARATEDBYASPACE.

BOUNDARYCONDITIONS:

1<=M<=9999999M
< N <=
99999991<=X<=99
99

EXAMPLEINPUT/OUTPUT1:

INPUT:
2
40
7

OUTPUT:
352821147

EXAMPLEINPUT/OUTPUT2:

INPUT:
66
121
11

OUTPUT:

12111099887766

PROGRAM

```
#include<stdio.h>in
t main()
{
	int
	m;int
	n;intx;
	scanf("%d %d",&m,&n);
	scanf("%d",&x);
	for(int i=n;i>m-1;i--)
	{
		if(i%x==0){
			printf("%d ",i);
		}
	}
}
```

OUTPUT

	Input	Expected	Got	
✔	2 40 7	35 28 21 14 7	35 28 21 14 7	✔

Passed all tests! ✔

Correct

Marks for this submission: 1.00/1.00.

EXPERIMENTNO: **1.7** **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

QUOTIENT&REMAINDER

WRITEACPROGRAMTOFINDTHEQUOTIENT&REMAINDEROFGIVENINTEGERS

FOREXAMPLE

Input	Result
12 3	4 0

PROGRAM

```
#include<stdio.h>in
t main()
{
   int
   dd;intdr
   ;
   scanf("%d",&dd);
   scanf("%d",&dr);int
   q;
   int
   rem;q=d
   d/dr;
   printf("%d\n",q);re
   m=dd%dr;
```

OUTPUT

	Input	Expected	Got	
✔	12 3	4 0	4 0	✔

Passed all tests! ✔

EXPERIMENTNO: 1.8 **DATE:**

REGISTERNO:231501050 **NAME:GK GOKUL PRASATH**

GREATESTOFALLNUMBERS

WRITEACPROGRAMTOFINDTHEGREATESTNUMBERSOF3INTEGERS.

FOREXAMPLE

Input	Result
10 20 30	30

PROGRAM

```
#include<stdio.h>in
t main()
{
int a;int b;intc;
scanf("%d %d %d",&a,&b,&c);
if(a>b && a>c){
        printf("%d",a);
}
else if(b>c &&
        b>a){printf("%d",b)
        ;
}
else
printf("%d",c);
```

OUTPUT

	Input	Expected	Got	
✔	10 20 30	30	30	✔

Passed all tests! ✔

EXPERIMENTNO: 1.9 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

EVENORODD

WRITEACPROGRAMTOFINDTHENUMBERISODDOREVEN?

FOREXAMPLE

Input	Result
12	Even
11	Odd

PROGRAM

```
#include<stdio.h>in
t main()
{
	int a;
	scanf("%d",&a);

	if(a%2==0){
		printf("Even");
	}
	else
	printf("Odd");
}
```

OUTPUT

	Input	Expected	Got	
✔	12	Even	Even	✔
✔	11	Odd	Odd	✔

Passed all tests! ✔

EXPERIMENTNO: 1.10 **DATE:**

REGISTERNO:231501050 **NAME:GK GOKUL PRASATH**

FACTORIALOFANUMBER

WRITEAPROGRAMTOFINDTHEFACTORIALOFANUMBER

FOREXAMPLE

Input	Result
5	120

PROGRAM

```
#include<stdio.h>in
t main()
{
	int
	factorial;factoria
	l=1;
	int n;
	scanf("%d",&n);
	for(int i=1;i<=n;i++)
	{
		factorial=factorial*i;
	}
	printf("%d",factorial);
}
```

OUTPUT

	Input	Expected	Got	
✔	5	120	120	✔

Passed all tests! ✔

EXPERIMENTNO: 1.11 **DATE:**

REGISTERNO:231501050 **NAME:GK GOKUL PRASATH**

SUMOFNNATURALNUMBERSWRITEA

CPROGRAMTOFINDTHESUMOFNNATURALNUMBERS**FOREXAMPL**

E

Input	Result
3	6

PROGRAM

```
#include<stdio.h>in
t main(){
	int number;
	scanf("%d",&number);i
	nt i;
	int
	sum;sum
	=0;
	for(i=number;i>=0;i--)
	{
		sum=sum+i;
	}
	printf("%d",sum);
}
```

OUTPUT

	Input	Expected	Got	
✔	3	6	6	✔

Passed all tests! ✔

EXPERIMENTNO: 1.12 **DATE:**

REGISTERNO:231501050 **NAME:GK GOKUL PRASATH**

FIBONACCISERIES

WRITEACPROGRAMTOFINDTHENTHTERMOFFIBONACCISERIES

FOREXAMPLE

Input	Result
0	0
1	1
4	3

PROGRAM

```
#include<stdio.h>in
t main()
{
  int
  a;int
  b;intc;
  int
  sum;b=0;
  c=1;
  sum=0;
  scanf("%d",&a);
  for(int i=0;i<a-
        1;i++){sum=b+c;
        b=c;c=
        sum;
  }
  if(a==1){
        printf("1");
  }else{
        printf("%d",sum);
  }
  }
```

OUTPUT

	Input	Expected	Got	
✔	0	0	0	✔
✔	1	1	1	✔
✔	4	3	3	✔

Passed all tests! ✔

Correct

Marks for this submission: 1.00/1.00.

EXPERIMENTNO: 1.13 **DATE:**

REGISTERNO:231501050 **NAME:GK GOKUL PRASATH**

POWEROFINTEGERS

WRITEACPROGRAMTOFINDTHEPOWEROFINTEGERS.

INPUT:

AB

OUTPUT:

A^BVALUE

FOREXAMPLE

Input	Result
2 5	32

PROGRAM

```
#include<stdio.h>#i
nclude<math.h>int
main()
{
	int
	a;intb;
	scanf("%d %d",&a,&b);

	int power;
	power=pow(a,b);
	printf("%d",power);
}
```

OUTPUT

	Input	Expected	Got	
✔	2 5	32	32	✔

Passed all tests! ✔

EXPERIMENTNO: 1.14 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PRIMEORNONPRIME

WRITEACPROGRAMTOFINDWHETHERNUMBERISPRIMEORNOT?

FOREXAMPLE

Input	Result
7	Prime
9	No Prime

PROGRAM

```
#include<stdio.h>
int main()
{
	int number;
	scanf("%d",&number);

	if(number%2==0){
	printf("No Prime");
	}
	else if(number%3==0){
		printf("No Prime");
	}
	else if(number%number==0 &&
		number/number==1){printf("Prime");
	}
	else
	printf("Prime");
```

OUTPUT

	Input	Expected	Got	
✔	7	Prime	Prime	✔
✔	9	No Prime	No Prime	✔

Passed all tests! ✔

EXPERIMENTNO: 1.15 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

REVERSEOFANINTEGER

WRITEACPROGRAMTOFINDTHEREVERSEOFANINTEGER.

PROGRAM

```
#include<stdio.h>in
t main()
{
    int n;
    scanf("%d",&n);in
    t reverse;
    reverse=0;i
    nt
    last;last=0;
    while(n!=0){la
    st=n%10;
    reverse=reverse*10+last;n/
    =10;
    }
    printf("%d",reverse);
}
```

OUTPUT

	Input	Expected	Got	
✔	123	321	321	✔

Passed all tests! ✔

Correct

Marks for this submission: 1.00/1.00.

WEEK 02 - FINDING TIMECOMPLEXITYOFALGORITHMS

EXPERIMENTNO: 2.1 **DATE:**

REGISTERNO:231501050 **NAME:GK GOKUL PRASATH**

COUNTERMETHOD-WHILELOOP

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIMECOMPLEXITYUSINGTHECOUNTERMETHOD.

```
voidfunction(intn)
{
    int
    i=1;Int
    s=1;
    While(s<=n)
    {
     I++;S
    +=I;
    }
}
```

NOTE:NONEEDOFCOUNTERINCREMENTFORDECLARATIONSANDSCANF()ANDCOUNT VARIABLEPRINTF()STATEMENTS.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE**FOREXAMPLE:**

INPUT	RESULT

9	**12**

PROGRAM

```
#include <stdio.h>int
main(){
int
count=0;int n;
scanf("%d",&n);in
t i=1;
count++;
int
s=1;coun
t++;
while(s<=n){c
ount++;
i++;
count++;
s+=1;
count++;
}
count++;
printf("%d",count);
```

OUTPUT

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

Passed all tests! ✔

Correct

Marks for this submission: 1.00/1.00.

EXPERIMENTNO: 2.2 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

COUNTERMETHOD-FORLOOP

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIMECOMPLEXITYUSINGTHECOUNTERMETHOD.

```
voidfunc(intn)
{
    if(n==1)
    {
       printf("*");
    }
    else
    {
     for(inti=1;i<=n;i++)
     {
        for(intj=1;j<=n;j++)
        {
            printf("*");
            printf("*");br
            eak;
        }
     }
   }
 }
```

NOTE:

NO NEED OF COUNTER INCREMENT FOR DECLARATIONS AND SCANF() AND COUNTVARIABLEPRINTF()STATEMENTS.

INPUT:

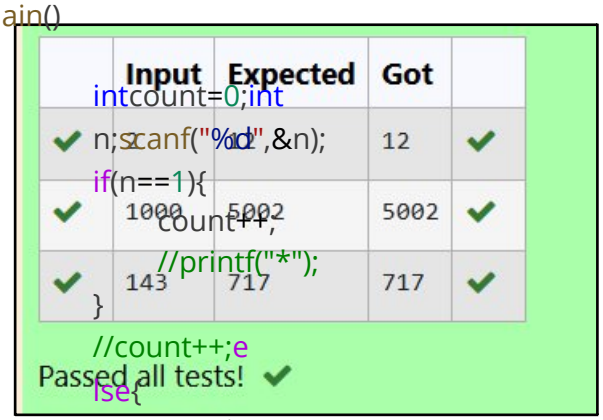
APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE

PROGRAM

OUTPUT



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

Passed all tests! ✔

```
#include<stdio.h>in
tmain()
{
    intcount=0;int
    n;scanf("%d",&n);
    if(n==1){
        count++;
        //printf("*");
    }
    //count++;e
    lse{
            count++;
            for(inti=1;i<=n;i++)
            {
                count++;
                for(intj=1;j<=n;j++)
                {
                    count++;
                    //printf("*");cou
                    nt++;
                    //printf("*");cou
                    nt++;break;coun
                    t++;
                }
                count++;
            }count++;
        }
        printf("%d",count);
    }
```

EXPERIMENTNO: 2.3 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

COUNTERMETHOD-FACTORS

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIMECOMPLEXITYUSINGCOUNTERMETHOD.

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

NOTE:

NONEEDOFCOUNTERINCREMENTFORDECLARATIONSANDSCANF()ANDCOUNTERVARIABLEPRINTF()STATEMENT.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE

PROGRAM

```
#include<stdio.h>in
t main()
{
	int num;
	scanf("%d",&num);i
	nt count=0;
	int i;
	for(i=1;i<=num;i++)
	{
		count++;
		if(num%i==0)
		{
			count++;
			//printf("%d ",i);
			//count++;
		}count++;
	}count++;
	printf("%d",count);
}
```

OUTPUT

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

Passed all tests! ✔

EXPERIMENTNO: 2.4 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

COUNTERMETHOD-FUNCTION

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIMECOMPLEXITYUSINGCOUNTERMETHOD.

```
voidfunction(intn)
{
   intc=0;
   for(int i=n/2; i<n;
      i++)for(intj=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 COUNTVARIABLEPRINTF()STATEMENTS.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE

PROGRAM

```
#include<stdio.h>in
t main()
{
    int n;
    scanf("%d",&n);in
    t count=0;
    int
    c=0;coun
    t++;
    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++;
    }
```

OUTPUT

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

Passed all tests! ✔

EXPERIMENTNO: 2.5 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

COUNTERMETHOD-REVERSE

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIMECOMPLEXITYUSI NGCOUNTERMETHOD.

```
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 COUNTVARIABLEPRINTF()STATEMENTS.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE

PROGRAM

```
#include<stdio.h>in
t main()
{
    int n;
    scanf("%d",&n);in
    t count=0;
    int
    c=0;coun
    t++;
    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++;
```

OUTPUT

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

Passed all tests! ✔

WEEK03–DIVIDEA NDCONQUER

EXPERIMENTNO: 3.1 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

NUMBEROFZEROSINANARRAY

PROBLEMSTATEMENT

GIVENANARRAYOF1SAND0STHISHASALL1SFIRSTFOLLOWEDBYALL0S.AIMISTO FIND THE NUMBER OF 0S. WRITE A PROGRAM USING DIVIDE AND CONQUER TOCOUNTTHENUMBEROFZEROESINTHEGIVENARRAY.

INPUTFORMAT

FIRSTLINECONTAINSINTEGERM–SIZEOFARRAY

NEXTMLINESCONTAINSMNUMBERS–ELEMENTSOFANARRAY

OUTPUTFORMAT

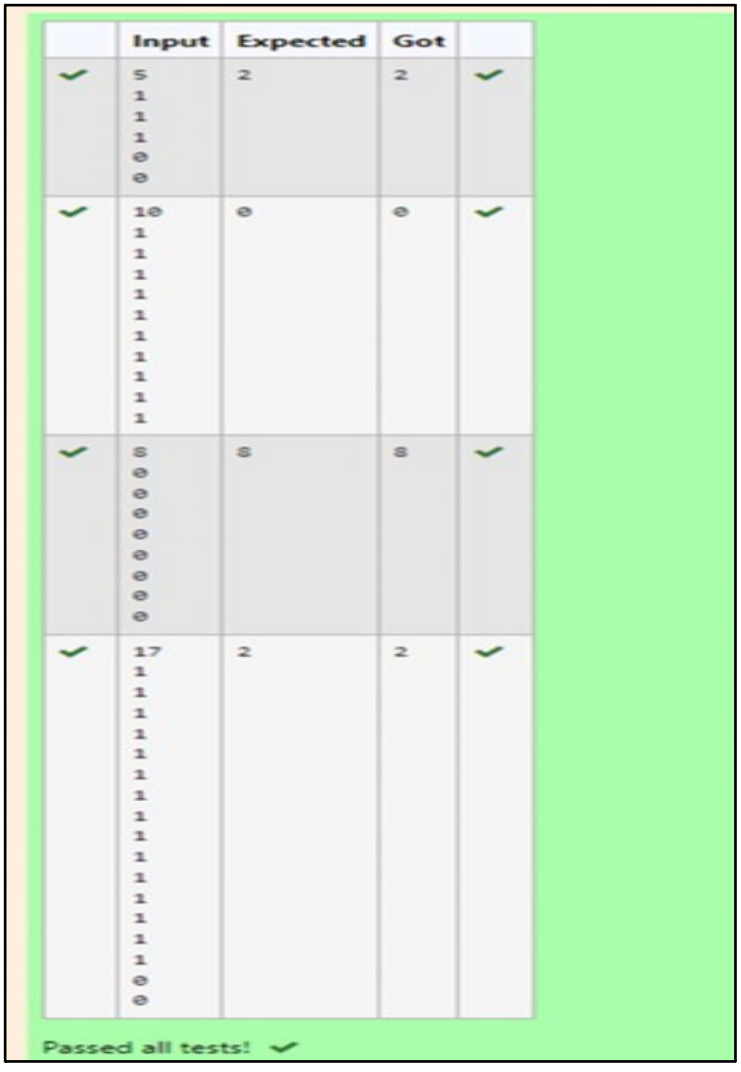
FIRSTLINECONTAINSINTEGER–NUMBEROFZEROESPRESENTINTHEGIVENARRAY.

PROGRAM

```
#include<stdio.h>in
tmain()
{
    int
    n;scanf("%d",&n);
    intarr[n];
    for(int i=0;i<n;i++){scanf("%d",&arr[i]);
    }
    inti;
    int
    count=0;for(i=0;i<
    n;i++)
```

```
    {
        if(arr[i]==0)
        {
                count=count+1;
    }
    }
}
```

OUTPUT



	Input	Expected	Got	
✔	5 1 1 1 0 0	2	2	✔
✔	10 1 1 1 1 1 1 1 1 1 1	0	0	✔
✔	8 0 0 0 0 0 0 0 0 0	8	8	✔
✔	17 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0	2	2	✔

Passed all tests! ✔

EXPERIMENTNO: 3.2 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

MAJORITYELEMENT

GIVENANARRAYNUMSOFSIZEN,RETURNTHEMAJORITYELEMENT.

THEMAJORITYELEMENTISTHEELEMENTTHATAPPEARSMORETHAN⌊N/2⌋TIMES.YOUM AYASSUMETHATTHEMAJORITYELEMENTALWAYSEXISTSINTHEARRAY.

EXAMPLE1:

INPUT:NUMS=[3,2,3]

OUTPUT:3

EXAMPLE2:

INPUT:NUMS=[2,2,1,1,1,2,2]

OUTPUT:2

CONSTRAINTS:

N==NUMS.LENGTH1

<=N<=5*104

-231<=NUMS[I]<=231-1

FOREXAMPLE:

Input	Result
3 3 2 3	3
7 2 2 1 1 1 2 2	2

PROGRAM

```
#include<stdio.h>in
t main(){
    int n;
    scanf("%d",&n);in
    t a[n];
    for(int
        i=0;i<n;i++){scanf("%
        d",&a[i]);
    }
    for(int i=0;i<n;i++){int
        count=0;
        for(int
            j=0;j<n;j++){if(a[i]==
            a[j]){
                count++;
            }
        }
        if(count>n/2){
            printf("%d",a[i]);brea
            k;
        }
    }
```

OUTPUT

	Input	Expected	Got	
✔	3 3 2 3	3	3	✔

Passed all tests! ✔

EXPERIMENTNO: 3.3 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

FINDINGFLOORVALUE

PROBLEMSTATEMENT:

GIVEN A SORTED ARRAY AND A VALUE X, THE FLOOR OF X IS THE LARGESTELEMENTINARRAYSMALLERTHANOREQUALTOX.WRITEDIVIDEANDCONQUERALGORITHMTOFINDFLOOROFX.

INPUTFORMAT

- FIRSTLINECONTAINSINTEGERN–SIZEOFARRAY
- NEXTNLINESCONTAINSNNUMBERS–ELEMENTSOFANARRAY
- LASTLINECONTAINSINTEGERX–VALUEFORX

OUTPUTFORMAT

FIRSTLINECONTAINSINTEGER–FLOORVALUEFORX

PROGRAM

```
#include<stdio.h>in
t main()
{
	int n;
	scanf("%d",&n);in
	t arr[n];
	for(int i=0;i<n;i++)
	{
		scanf("%d",&arr[i]);
	}
	int key=0;
	scanf("%d",&key);int
	floor=arr[0];
	for(int j=1;j<n;j++)
	{
		if(arr[j]>floor && arr[j]<key)
```

```
            floor=arr[j];
        }
        printf("%d",floor);
}
```

OUTPUT

	Input	Expected	Got	
✔	6 1 2 8 10 12 19 5	2	2	✔
✔	5 10 22 85 108 129 100	85	85	✔
✔	7 3 5 7 9 11 13 15 10	9	9	✔

Passed all tests! ✔

EXPERIMENTNO: 3.4 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

TWOELEMENTSSUMTOX

PROBLEMSTATEMENT:

GIVEN A SORTED ARRAY OF INTEGERS SAY ARR[] AND A NUMBER X. WRITE ARECURSIVEPROGRAMUSINGDIVIDEANDCONQUERSTRATEGYTOCHECKIFTHEREEXIST TWO ELEMENTS IN THE ARRAY WHOSE SUM = X. IF THERE EXIST SUCH TWOELEMENTSTHENRETURNTHENUMBERS,OTHERWISEPRINTAS“NO”.

NOTE:WRITEADIVIDEANDCONQUERSOLUTION

INPUTFORMAT

- FIRSTLINECONTAINSINTEGERN–SIZEOFARRAY
- NEXTNLINESCONTAINSNNUMBERS–ELEMENTSOFANARRAY
- LASTLINECONTAINSINTEGERX–SUMVALUE

OUTPUTFORMAT

- FIRSTLINECONTAINSINTEGER–ELEMENT1
- SECONDLINECONTAINSINTEGER–ELEMENT2(ELEMENT1ANDELEMENTS2TOGETHERSUMSTOVALUE“X”)

PROGRAM

```
#include<stdio.h>in
tmain()
{
    int
    n;scanf("%d",&n);
    intarr[n];

    for(int i=0;i<n;i++){scanf("%d",&arr[i]);
    }

    inti,j;
```

```
        int
        flag;intx;
        scanf("%d",&x);for(i

        =0;i<n;i++){

                for(j=i+1;j<n;j++){if(arr[i]+arr[j]==x){

                                printf("%d\n%d",arr[i],arr[j]);flag=1;

                                break;
                        }

                }
        }
        if(flag==0)printf
        ("No");
}
```

OUTPUT

	Input	Expected	Got	
✔	4 2 4 8 10 14	4 10	4 10	✔
✔	5 2 4 6 8 10 100	No	No	✔

Passed all tests! ✔

EXPERIMENTNO: 3.5 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

IMPLEMENTATIONOFQUICKSORT

WRITEAPROGRAMTOIMPLEMENTTHEQUICKSORTALGORITHM

INPUTFORMAT:

- THEFIRSTLINECONTAINSTHENOOFELEMENTSINTHELIST-N
- THENEXTNLINESCONTAINTHEELEMENTS.

OUTPUT:

SORTEDLISTOFELEMENTS

FOREXAMPLE:

Input	Result
5 67 34 12 98 78	12 34 67 78 98

PROGRAM

```
#include<stdio.h>in
tmain(){
    int
    n;scanf("%d",&n);i
    ntarr[n];

    for(inti=0;i<n;i++){scanf("%d",&arr[i]);
    }

    for(inti=0;i<n-1;i++){
```

```
            for(intj=0;j<n-i-1;j++)
{
                    if(arr[j]>arr[j+1]){int temp =
                        arr[j];arr[j] =
                        arr[j+1];arr[j+1]=temp;
                    }
                }
        }


        for(int i = 0; i < n;
            i++)printf("%d",arr[i]);
        }

        return0;
}
```

OUTPUT

	Input	Expected	Got	
✔	5 67 34 12 98 78	12 34 67 78 98	12 34 67 78 98	✔
✔	10 1 56 78 90 32 56 11 10 90 114	1 10 11 32 56 56 78 90 90 114	1 10 11 32 56 56 78 90 90 114	✔
✔	12 9 8 7 6 5 4 3 2 1 10 11 90	1 2 3 4 5 6 7 8 9 10 11 90	1 2 3 4 5 6 7 8 9 10 11 90	✔

Passed all tests! ✔

WEEK04–GREEDYA LGORITHMS

EXPERIMENTNO: 4.1 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

COINPROBLEM

WRITEAPROGRAMTOTAKEVALUEVANDWEWANTTOMAKECHANGEFORVRS,AND WE HAVE INFINITE SUPPLY OF EACH OF THE DENOMINATIONS IN INDIANCURRENCY, I.E., WE HAVE INFINITE SUPPLY OF { 1, 2, 5, 10, 20, 50, 100, 500, 1000}VALUED COINS/NOTES, WHAT IS THE MINIMUM NUMBER OF COINS AND/OR NOTESNEEDEDTOMAKETHECHANGE.

INPUTFORMAT:

TAKEANINTEGERFROMSTDIN.

OUTPUTFORMAT:

PRINTTHEINTEGERWHICHISCHANGEOFTHENUMBER.

EXAMPLEINPUT:

64

OUTPUT:

4

EXPLANATON:

WENEEDA50RSNOTEANDA10RSNOTEANDTWO2RUPEECOINS.

PROGRAM

```
#include<stdio.h>in
t main()
{
	int value;
	scanf("%d",&value);

	int currency[]={1000,500,100,50,20,10,5,2,1};
	int totalcurrency;
	totalcurrency=sizeof(currency)/sizeof(currency[0]);int

	count=0;

	for(int i=0;i<totalcurrency;i++)
	{
		if(value==0)
		{
			break;
		}
		count=count+(value/currency[i]);

		value=value%currency[i];
	}
	printf("%d",count);
}
```

OUTPUT

	Input	Expected	Got	
✔	49	5	5	✔

Passed all tests! ✔

EXPERIMENTNO: 4.2 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

COOKIESPROBLEM

ASSUMEYOUAREANAWESOMEPARENTANDWANTTOGIVEYOURCHILDRENSOMECOOKIES.BUT,YOUSHOULDGIVEEACHCHILDATMOSTONECOOKIE.

EACH CHILD I HAS A GREED FACTOR G[I], WHICH IS THE MINIMUM SIZE OF A COOKIETHAT THE CHILD WILL BE CONTENT WITH; AND EACH COOKIE J HAS A SIZE S[J].
IFS[J]>=G[I],WECANASSIGNTHECOOKIEJTOTHECHILDI,ANDTHECHILDIWILLBECONTENT. YOUR GOAL IS TO MAXIMIZE THE NUMBER OF YOUR CONTENT CHILDRENANDOUTPUTTHEMAXIMUMNUMBER.

EXAMPLE1:

INPUT:

3

123

2

11

OUTPUT:

1

EXPLANATION:

- YOUHAVE3CHILDRENAND2COOKIES.THEGREEDFACTORSOF3CHILDRENARE1, 2,3.
- ANDEVENTHOUGHYOUHAVE2COOKIES,SINCETHEIRSIZEISBOTH1,YOUCOULDONLYMAKETHECHILDWHOSEGREEDFACTORIS1CONTENT.
- YOUNEEDTOOUTPUT1.

CONSTRAINTS:

1<=G.LENGTH<=3*10^4

0<=S.LENGTH<=3*10^4

1<=G[I],S[J]<=2^31-1

PROGRAM

```
#include<stdio.h>int
main(){
    int
    n;scanf("%d",&n);
    intgreedfactor[n];
    for (int i = 0; i < n; i++)
        {scanf("%d",&greedfactor[i]);
    }
    intm;scanf("%d",
    &m);intcookiesize[m]
    ;
    for (int j = 0; j < m; j++)
        {scanf("%d",&cookiesize[j]);
    }
    for(inti=0;i<n-1;i++){
        for(intj=0;j<n-i-1;j++){
            if(greedfactor[j]>greedfactor[j+1]){int temp =
                greedfactor[j];greedfactor[j] = greedfactor[j +
                1];greedfactor[j+1]=temp;
            }
        }
    }
    for(inti=0;i<m-1;i++){
        for(intj=0;j<m-i-1;j++){
            if(cookiesize[j]>cookiesize[j+1]){int temp =
                cookiesize[j];cookiesize[j] = cookiesize[j +
                1];cookiesize[j+1]=temp;
            }
        }
    }
    int i =
    0;intj=0;
    intcontents=0;
    while(i<n&&j<m){
        if(cookiesize[j]>=greedfactor[i]){contents++;
            i++;
        }j++;
    }
    printf("%d\n",contents);return0;
}
```

OUTPUT

	Input	Expected	Got	
✔	2 1 2 3 1 2 3	2	2	✔

Passed all tests! ✔

EXPERIMENTNO: 4.3 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

BURGERPROBLEM

APERSONNEEDSTOEATBURGERS.EACHBURGERCONTAINSACOUNTOFCALORIE.AFTEREATINGTHEBURGER,THEPERSONNEEDSTORUNADISTANCETOBURNOUTHIS CALORIES. IF HE HAS EATEN I BURGERS WITH C CALORIES EACH, THEN HE HASTO RUN AT LEAST 3I * CKILOMETERS TO BURN OUT THE CALORIES. FOREXAMPLE,IF HE ATE 3 BURGERS WITH THE COUNT OF CALORIE IN THE ORDER: [1, 3, 2], THEKILOMETERS HE NEEDS TO RUN ARE (30 * 1) + (31 * 3) + (32 * 2) = 1 + 9 + 18 = 28.BUTTHIS IS NOT THE MINIMUM, SO NEED TO TRY OUT OTHER ORDERS OF CONSUMPTIONAND CHOOSE THE MINIMUM VALUE. DETERMINE THE MINIMUM DISTANCE .HENEEDS TO RUN. NOTE: HE CAN EAT BURGER IN ANY ORDER AND USE AN EFFICIENTSORTINGALGORITHM.APPLYGREEDYAPPROACHTOSOLVETHEPROBLEM.

INPUTFORMAT

- FIRSTLINECONTAINSTHENUMBEROFBURGERS
- SECONDLINECONTAINSCALORIESOFEACHBURGERWHICHISNSPACE-SEPARATEINTEGERS

OUTPUTFORMAT

- PRINT:MINIMUMNUMBEROFKILOMETERSNEEDEDTORUNTOBURNOUTTHE CALORIES

SAMPLEINPUT

3

5107

SAMPLEOUTPUT

76

FOREXAMPLE

Test	Input	Result
Test Case 1	3 1 3 2	18

PROGRAM

```
#include<stdio.h>#i
nclude<math.h>int
main(){
    int
    n=0;scanf("%d",&
    n);inta[n];
    for(int
        i=0;i<n;i++){scanf("%
        d",&a[i]);
    }
    for(int i=0;i<n-1;i++){for(intj=0;j<n-
        i-1;j++){
            if(a[j]>a[j+1]){int
                temp=a[j];a[j]=a[
                j+1];a[j+1]=temp
                ;
            }
        }
    }
    int j=n-
    1;intsum=0;
    for(int
        i=0;i<n;i++){sum=sum+((pow(n
        ,i))*a[j]);j--;
    }
```

OUTPUT

	Test	Input	Expected	Got	
✔	Test Case 1	3 1 3 2	18	18	✔
✔	Test Case 2	4 7 4 9 6	389	389	✔
✔	Test Case 3	3 5 10 7	76	76	✔

Passed all tests! ✔

EXPERIMENTNO: 4.4 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

ARRAYSUMMAXPROBLEM

GIVENANARRAYOFNINTEGER,WEHAVETOMAXIMIZETHESUMOFARR[I]*I,WHERE I IS THE INDEX OF THE ELEMENT (I = 0, 1, 2, ..., N).WRITE AN ALGORITHMBASEDONGREEDYTECHNIQUEWITHACOMPLEXITYO(NLOGN).

INPUTFORMAT:

- FIRSTLINESPECIFIESTHENUMBEROFELEMENTS-N
- THENEXTNLINESCONTAINTHEARRAYELEMENTS.

OUTPUTFORMAT:

MAXIMUMARRAYSUMTOBEPRINTED.

SAMPLEINPUT:

5

25340

SAMPLEOUTPUT:

40

PROGRAM

```
#include<stdio.h>in
t main(){
	int n;
	scanf("%d",&n);in
	t arr[n];
	for(int i=0;i<n;i++)
	{
		scanf("%d ",&arr[i]);
	}
	for(int i=0;i<n-1;i++)
	{
```

```
            for(int j=0;j<n-i-
                1;j++){if(arr[j]>arr[j+1]){in
                t temp=arr[j];
                arr[j]=arr[j+1];arr[j
                +1]=temp;
            }
        }
}

int maximum=0;
for(int i=0;i<n;i++){
        maximum=maximum+(arr[i]*i);
}printf("%d\n",maximum);
}
```

OUTPUT

	Input	Expected	Got	
✔	5 2 5 3 4 0	40	40	✔
✔	10 2 2 2 4 4 3 3 5 5 5	191	191	✔
✔	2 45 3	45	45	✔

Passed all tests! ✔

EXPERIMENTNO: 4.5 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PRODCUTOFARRAYELEMENTS-MIN

GIVENTWOARRAYSARRAY_ONE[]ANDARRAY_TWO[]OFSAMESIZEN.WENEEDTOFIRST REARRANGE THE ARRAYS SUCH THAT THE SUM OF THE PRODUCT OF PAIRS(1ELEMENTFROMEACH)ISMINIMUM.THATISSUM(A[I]*B[I])FORALLIISMINIMUM.

FOREXAMPLE

Input	Result
3 1 2 3 4 5 6	28

PROGRAM

```
#include
<stdio.h>#include
<stdlib.h>int main() {
    int n;
    scanf("%d", &n);int
    arrayOne[n];intarr
    ayTwo[n];
    for (int i=0;i<n;i++) {
        scanf("%d",&arrayOne[i]);
    }
    for (int i=0;i<n;i++) {
        scanf("%d",&arrayTwo[i]);
    }
    for (int i=0;i<n-1;i++) {
        for (int j=0;j<n-i-1;j++) {
            if (arrayOne[j]>arrayOne[j+1]) {int
                temp = arrayOne[j];
                arrayOne[j]=arrayOne[j +
                1];arrayOne[j+1]=temp;
            }
        }
    }
    for (int i=0;i<n-1;i++) {
        for (int j=0;j<n-i-1;j++) {
            if (arrayTwo[j]<arrayTwo[j+1]) {
```

```
                    int temp=arrayTwo[j];
                    arrayTwo[j]=arrayTwo[j+1];arr
                    ayTwo[j+1]=temp;
                }
            }
        }
        int minimumsum = 0;
        for (int i = 0; i < n; i++) {
            minimumsum=minimumsum+arrayOne[i]*arrayTwo[i];
        }
        printf("%d\n", minimumsum);
}
```

OUTPUT

	Input	Expected	Got	
✔	3 1 2 3 4 5 6	28	28	✔
✔	4 7 5 1 2 1 3 4 1	22	22	✔
✔	5 20 10 30 10 40 8 9 4 3 10	590	590	✔

WEEK – 05PLAYINGWITHNUMBERS

EXPERIMENTNO: 5.1 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PLAYINGWITHNUMBERS

PLAYINGWITHNUMBERS:

RAM AND SITA ARE PLAYING WITH NUMBERS BY GIVING PUZZLES TO EACHOTHER.NOWITWASRAMTERM,SOHEGAVESITAAPOSITIVEINTEGER‘N’ANDTWONUMBERS1AND3.HEASKEDHERTOFINDTHEPOSSIBLEWAYSBYWHICHTHENUMBER N CAN BE REPRESENTED USING 1 AND 3.WRITE ANY EFFICIENTALGORITHMTOFINDTHEPOSSIBLEWAYS.

EXAMPLE1:

INPUT:

6

OUTPUT:

6

EXPLANATION:

THEREARE6WAYSTO6REPRESENTNUMBERWITH1AND31+1+1+
1+1+1
3+3
1+1+1+3
1+1+3+1
1+3+1+1
3+1+1+1

INPUTFORMAT

FIRSTLINECONTAINSTHENUMBERN

OUTPUTFORMAT

PRINT:

THENUMBEROFPOSSIBLEWAYS‘N’CANBEREPRESENTEDUSING1AND3

SAMPLEINPUT

6

SAMPLEOUTPUT

6

PROGRAM

```
#include <stdio.h>int
main() {
        long n;
        scanf("%ld", &n);if
        (n < 0) {
                return 0;
        }
        long array[n +
        1];array[0] = 1;
        array[1] = 1;
        array[2] = 1;
        array[3] = 2;
        for (long i = 4; i <= n; i++) {
                array[i] = array[i - 1] + array[i - 3];
        }
        printf("%ld\n", array[n]);return
        0;
}
```

OUTPUT

	Input	Expected	Got	
✔	6	6	6	✔
✔	25	8641	8641	✔
✔	100	24382819596721629	24382819596721629	✔

Passed all tests! ✔

EXPERIMENTNO: 5.2 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PLAYINGWITHCHESSBOARD

PLAYINGWITHCHESSBOARD:

RAM IS GIVEN WITH AN N*N CHESSBOARD WITH EACH CELL WITH A MONETARYVALUE. RAM STANDS AT THE (0,0), THAT THE POSITION OF THE TOP LEFT WHITEROOK. HE IS BEEN GIVEN A TASK TO REACH THE BOTTOM RIGHT BLACK ROOKPOSITION (N-1, N-1) CONSTRAINED THAT HE NEEDS TO REACH THE POSITION BYTRAVELINGTHEMAXIMUMMONETARYPATHUNDERTHECONDITIONTHATHECANONLY TRAVEL ONE STEP RIGHT OR ONE STEP DOWN THE BOARD. HELP RAM TOACHIEVEITBYPROVIDINGANEFFICIENTDPALGORITHM.

EXAMPLE:

INPUT

3

124

234

871

OUTPUT:

19

EXPLANATION:

TOTALLYTHEREWILLBE6PATHSAMONGTHATTHEOPTIMALISOPTIMALPA

THVALUE:1+2+8+7+1=19

INPUTFORMAT

- FIRSTLINECONTAINSTHEINTEGERN
- THENEXTNLINESCONTAINTHEN*NCHESSBOARDVALUES

OUTPUTFORMAT

PRINTMAXIMUMMONETARYVALUEOFTHEPATH

PROGRAM

```
#include<stdio.h>
intmaxMonetaryPath(intn,intboard[n][n])
{
	intdp[n][n];
	dp[0][0]=board[0][0];

	for(intj=1;j<n;j++){
		dp[0][j]=dp[0][j-1]+board[0][j];
	}

	for(inti=1;i<n;i++){
		dp[i][0]=dp[i-1][0]+board[i][0];
	}

	for(inti=1;i<n;i++){for(intj=1;j<n;j++){

			dp[i][j]=board[i][j]+(dp[i-1][j]>dp[i][j-1]?dp[i-1][j]:dp[i][j-1]);

		}
	}
	returndp[n-1][n-1];
}

intmain(){
	int
	n;scanf("%d",&n);
	intboard[n][n];

	for(inti=0;i<n;i++){for(intj=0;j<n;j++){

			scanf("%d",&board[i][j]);
		}
	}

	intmaxValue=maxMonetaryPath(n,board);printf("%d\n",
	maxValue);
	return0;
}
```

OUTPUT

	Input	Expected	Got	
✔	3 1 2 4 2 3 4 8 7 1	19	19	✔
✔	3 1 3 1 1 5 1 4 2 1	12	12	✔
✔	4 1 1 3 4 1 5 7 8 2 3 4 6 1 6 9 0	28	28	✔

Passed all tests! ✔

EXPERIMENTNO: 5.3 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

LONGESTCOMMONSUBSEQUENCE

GIVENTWOSTRINGSFINDTHELENGTHOFTHECOMMONLONGESTSUBSEQUENCE(NEED NOTBECONTIGUOUS)BETWEENTHETWO.

EXAMPLE:

S1:GGTABE

S2:TGATASB

S1: A G G T A B

S2: G X T X A Y B

THELENGTHIS4

SOLVINGITUSINGDYNAMICPROGRAMMING

FOREXAMPLE:

Input	Result
aab azb	2

PROGRAM

```
#include
<stdio.h>#include<stri
ng.h>

intlongestCommonSubsequence(char*s1,char*s2){intm=strle
      n(s1);
      int n =

      strlen(s2);intdp[m+1][n+

      1];

      for(inti=0;i<=m;i++){for(intj=0;j<=n;j++){
            if(i==0||j==0){dp[i][j]=0;
            }elseif(s1[i-1]==s2[j-1]){
                  dp[i][j]=dp[i-1][j-1]+1;
            }else{
                  dp[i][j]=(dp[i-1][j]>dp[i][j-1])?dp[i-1][j]:
        dp[i][j-1];
            }
         }
      }

      returndp[m][n];
}

intmain(){
      chars1[100],s2[100];

      fgets(s1,sizeof(s1),stdin);s1[strcspn(s1,"\n")
      ]='\0';

      fgets(s2,sizeof(s2),stdin);s2[strcspn(s2,"\n")
      ]='\0';
      intlength=longestCommonSubsequence(s1,s2);printf("%d\n",l
      ength);

      return0;
}
```

OUTPUT

	Input	Expected	Got	
✔	aab azb	2	2	✔
✔	ABCD ABCD	4	4	✔

Passed all tests! ✔

EXPERIMENTNO: 5.4 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

LONGESTNON-DECREASINGSUBSEQUENCE

PROBLEMSTATEMENT:

FINDTHELENGTHOFTHELONGESTNON-DECREASINGSUBSEQUENCEINAGIVENSEQUENCE.

EXAMPLE:

INPUT:

9

SEQUENCE:[-1,3,4,5,2,2,2,2,3]

THESUBSEQUENCEIS[-1,2,2,2,2,3]

OUTPUT:

6

PROGRAM

```
#include<stdio.h>
    intlongseq(intarr[],intn){intdp[n];
            for(inti=0;i<n;i++){dp[i]=
                    1;
            }
            for(inti=1;i<n;i++){for(intj=0;j<i;j++){
                    if(arr[i]>=arr[j]){
                            dp[i]=(dp[i]>dp[j]+1)?dp[i]:dp[j]+1;
                    }
            }
```

```
}
    int
    maximumlength=0;for(i
    nti=0;i<n;i++){
        if(dp[i]>maximumlength){maximumle
            ngth=dp[i];
        }
    }
    returnmaximumlength;
    }
    intmain()
{
    int
    n;scanf("%d",&n);

    intarr[n];
    for(inti=0;i<n;i++)
    {
        scanf("%d",&arr[i]);
    }
    intlength=longseq(arr,n);printf("%d\n",leng
    th);

    return0;
}
```

OUTPUT

	Input	Expected	Got	
✔	9 -1 3 4 5 2 2 2 2 3	6	6	✔
✔	7 1 2 2 4 5 7 6	6	6	✔

Passed all tests! ✔

WEEK06–COMPETITIVEPROGRAMMING

EXPERIMENTNO: 6.1 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

FINDINGDUPLICATES-O(N^2)TIMECOMPLEXITY,O(1)SPACECOMPLEXITY

FINDDUPLICATEINARRAY.

- GIVENAREADONLYARRAYOFNINTEGERSBETWEEN1ANDN,FINDONENUMBERTHATREPEATS.

INPUTFORMAT:

- FIRSTLINE-NUMBEROFELEMENTS
- NLINES-NELEMENTS

OUTPUTFORMAT:

ELEMENTX-THATISREPEATED

FOREXAMPLE:

Input	Result
5 1 1 2 3 4	1

PROGRAM

```
#include<stdio.h>in
tmain()
{
    int
    n,i,count;scanf("
    %d",&n);intarr[n];
```

```
    for(i=0;i<n;i++)
    {
        scanf("%d",&arr[i]);
    }
    for(i=0;i<n;i++){cou
        nt=0;
        for(int
            j=0;j<n;j++){if(arr[i]==a
            rr[j]){
                count=count+1;
            }
        }
    if(count>1){
}
}
```

OUTPUT

	Input	Expected	Got	
✔	11 10 9 7 6 5 1 2 3 8 4 7	7	7	✔
✔	5 1 2 3 4 4	4	4	✔
✔	5 1 1 2 3 4	1	1	✔

Passed all tests! ✔

EXPERIMENTNO: 6.2 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

FINDINGDUPLICATES-O(N)TIMECOMPLEXITY,O(1)SPACECOMPLEXITY

FINDDUPLICATEINARRAY.

- GIVENAREADONLYARRAYOFNINTEGERSBETWEEN1ANDN,FINDONENUMBERTHATREPEATS.

INPUTFORMAT:

- FIRSTLINE-NUMBEROFELEMENTS
- NLINES-NELEMENTS

OUTPUTFORMAT:

- ELEMENTX-THATISREPEATED

FOREXAMPLE:

Input	Result
5 1 1 2 3 4	1

PROGRAM

```
#include<stdio.h>in
tmain()
{
    int
    n,i,count;scanf("%
    d",&n);int
    arr[n];for(i=0;i<n;i+
    +)
    {
        scanf("%d",&arr[i]);
    }
```

```
        for(i=0;i<n;i++){coun
                t=0;
                for(int j=0;j<n;j++){if(arr[i]==arr[j]){
                                count=count+1;
                        }
                }
        if(count>1){
                printf("%d\n",arr[i]);break;
        }
}

}
```

OUTPUT

	Input	Expected	Got	
✔	11 10 9 7 6 5 1 2 3 8 4 7	7	7	✔
✔	5 1 2 3 4 4	4	4	✔
✔	5 1 1 2 3 4	1	1	✔

Passed all tests! ✔

EXPERIMENTNO: 6.3 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PRINTINTERSECTIONOF2SORTEDARRAYS-O(M*N)TIMECOMPLEXITY,O(1)SPACECOMPLEXITY

FINDTHEINTERSECTIONOFTWOSORTEDARRAYSORINOTHERWORDS,

- GIVEN2SORTEDARRAYS,FINDALLTHEELEMENTSWHICHOCCURINBOTHTHE ARRAYS.

INPUTFORMAT

· THEFIRSTLINECONTAINST,THENUMBEROFTESTCASES.FOLLOWINGTLINESCONT AIN:

1. LINE1CONTAINSN1,FOLLOWEDBYN1INTEGERSOFTHEFIRSTARRAY
2. LINE2CONTAINSN2,FOLLOWEDBYN2INTEGERSOFTHESECONDARRAY

OUTPUTFORMAT

- THEINTERSECTIONOFTHEARRAYSINASINGLELINE

EXAMPLE

INPUT:

1

3101757

627101557246

OUTPUT:

1057

INPUT:

1

6123456

216

OUTPUT:

16

FOREXAMPLE:

Input	Result
1 3 10 17 57 6 2 7 10 15 57 246	10 57

PROGRAM

```
#include<stdio.h>
voidfindIntersection(intarr1[],intv1,intarr2[],intv2){inti=0,j=0;
        while(i<v1&&j<v2){if(arr1[i]==arr2[
                j]){
                        printf("%d",arr1[i]);i++;
                        j++;
                }elseif(arr1[i]<arr2[j]){i++;
                }else{
                        j++;
                }
        }
        printf("\n");
}
intmain(){
        int
        T;scanf("%d",&T);
        while(T--){
                int
                v1;scanf("%d",&v1);i
                ntarr1[v1];
                for(inti=0;i<v1;i++){scanf("%d",&arr1[i]);
                }
                int
                v2;scanf("%d",&v2);i
                ntarr2[v2];
                for(inti=0;i<v2;i++){scanf("%d",&arr2[i]);
                }
                findIntersection(arr1,v1,arr2,v2);
        }
        return0;
}
```

OUTPUT

	Input	Expected	Got	
✔	1 3 10 17 57 6 2 7 10 15 57 246	10 57	10 57	✔
✔	1 6 1 2 3 4 5 6 2 1 6	1 6	1 6	✔

Passed all tests! ✔

EXPERIMENTNO: 6.4 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PRINTINTERSECTIONOF2SORTEDARRAYS-
O(M+N)TIMECOMPLEXITY,O(1)SPACECOMPLEXITY

FINDTHEINTERSECTIONOFTWOSORTEDARRAYSORINOTHERWORDS,

- GIVEN2SORTEDARRAYS,FINDALLTHEELEMENTSWHICHOCCURINBOTHTHE ARRAYS.

INPUTFORMAT

· THEFIRSTLINECONTAINST,THENUMBEROFTESTCASES.FOLLOWINGTLINESCONT AIN:

1. LINE1CONTAINSN1,FOLLOWEDBYN1INTEGERSOFTHEFIRSTARRAY
2. LINE2CONTAINSN2,FOLLOWEDBYN2INTEGERSOFTHESECONDARRAY

OUTPUTFORMAT

THEINTERSECTIONOFTHEARRAYSINASINGLELINE

EXAMPLE

INPUT:

1

3101757

627101557246

OUTPUT:

1057

INPUT:

1

6123456

216

OUTPUT:

16

FOREXAMPLE:

Input	Result
1 3 10 17 57 6 2 7 10 15 57 246	10 57

PROGRAM

```
#include <stdio.h>
void findIntersection(int arr1[], int n1, int arr2[], int n2) {int i = 0, j = 0;
	while (i < n1 && j < n2) {
		if (arr1[i] == arr2[j]) {
			printf("%d ",arr1[i]);i++;
			j++;
		} else if (arr1[i] < arr2[j]) {i++;
		} else {
			j++;
		}
	}
	printf("\n");
}
int main() {
	int T;
	scanf("%d", &T);
	while (T--) {
		int n1;
		scanf("%d", &n1);int
		arr1[n1];
		for (int i = 0; i < n1; i++) {scanf("%d",
			&arr1[i]);
		}
		int n2;
		scanf("%d", &n2);int
		arr2[n2];
		for (int i = 0; i < n2; i++) {scanf("%d",
			&arr2[i]);
		}
		findIntersection(arr1, n1, arr2, n2);
	}
	return 0;
}
```

OUTPUT

	Input	Expected	Got	
✔	1 3 10 17 57 6 2 7 10 15 57 246	10 57	10 57	✔
✔	1 6 1 2 3 4 5 6 2 1 6	1 6	1 6	✔

Passed all tests! ✔

EXPERIMENTNO: 6.5 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PAIRWITHDIFFERENCE-O(N^2)TIMECOMPLEXITY,O(1)SPACECOMPLEXITY

GIVEN AN ARRAY A OF SORTED INTEGERS AND ANOTHER NON NEGATIVEINTEGERK,FINDIFTHEREEXISTS2INDICESIANDJSUCHTHATA[J]-A[I]=K,I!=J.

INPUTFORMAT:

- FIRSTLINEN-NUMBEROFELEMENTSINANARRAY
- NEXTNLINES-NELEMENTSINTHEARRAY
- K-NON-NEGATIVEINTEGER

OUTPUTFORMAT:

- 1-IFPAIREXISTS
- 0-IFNOPAIREXISTS

EXPLANATIONFORTHEGIVENSAMPLETESTCASE:

YESAS5-1=4

SORETURN1.

FOREXAMPLE

Input	Result
3 1 3 5 4	1

PROGRAM

```
#include<stdio.h>in
tmain()
{
```

```
    int
    n;scanf("%d",&n);i
    ntarray[n];
    for(inti=0;i<n;i++)
    {
        scanf("%d",&array[i]);
    }
    int
    d;scanf("%d",&d);i
    ntcount=0;
    for(int
        i=0;i<n;i++){for(intj=0;j<n
        ;j++){
            if(i!=j){
                if(array[j]-array[i]==d){count=count+1;
                }
            }
        }
    }
    if(count==0){
        printf("0");
    }elseprintf("1");
}
```

OUTPUT

	Input	Expected	Got	
✔	3 1 3 5 4	1	1	✔
✔	10 1 4 6 8 12 14 15 20 21 25 1	1	1	✔
✔	10 1 2 3 5 11 14 16 24 28 29 0	0	0	✔
✔	10 0 2 3 7 13 14 15 20 24 25 10	1	1	✔

Passed all tests! ✔

EXPERIMENTNO: 6.6 **DATE:**

REGISTERNO:231501050 **NAME: GK GOKUL PRASATH**

PAIRWITHDIFFERENCE-O(N)TIMECOMPLEXITY,O(1)SPACECOMPLEXITY

GIVENANARRAYAOFSORTEDINTEGERSANDANOTHERNONNEGATIVEINTEGERK,FINDI FTHEREEXISTS2INDICESIANDJSUCHTHATA[J]-A[I]=K,I!=J.

INPUTFORMAT:

- FIRSTLINEN-NUMBEROFELEMENTSINANARRAY
- NEXTNLINES-NELEMENTSINTHEARRAY
- K-NON-NEGATIVEINTEGER

OUTPUTFORMAT

- 1-IFPAIREXISTS
- 0-IFNOPAIREXISTS

EXPLANATIONFORTHEGIVENSAMPLETESTCASE:YESA

S5-1=4

SORETURN1.

FOREXAMPLE

Input	Result
3 1 3 5 4	1

PROGRAM

```
#include<stdio.h>in
tmain()
{
	int
	n;scanf("%d",&n);

	int
	array[n];for(inti=0;i<n;i
	++)
	{
		scanf("%d",&array[i]);
	}
	int
	d;scanf("%d",&d);i
	ntcount=0;

	for(int

		i=0;i<n;i++){for(intj=0;j<n

		;j++){

			if(i!=j){

				if(array[j]-array[i]==d){

					count=count+1;
				}
			}
		}
	}

	if(count==0)
{
		printf("0");
	}
	  else
			printf("1");
}
```

OUTPUT

	Input	Expected	Got	
✔	3 1 3 5 4	1	1	✔
✔	10 1 4 6 8 12 14 15 20 21 25 1	1	1	✔
✔	10 1 2 3 5 11 14 16 24 28 29 0	0	0	✔
✔	10 0 2 3 7 13 14 15 20 24 25 10	1	1	✔

Passed all tests! ✔