RAJALAKSHMI ENGINEERING COLLEGE

RAJALAKSHMINAGAR,THANDALAM– 602105

RAJALAKSHMI
ENGINEERING COLLEGE

CS23331- DESIGNANDANALYSISOFALGORITHM
LABORATORYLABMANUAL

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WEEK01– BASICC PROGRAMS

EXPERIMENTNO:1.1DATE:

SWAPPING OF TWO NUMBERS

GIVEN TWO NUMBERS, WRITE A C PROGRAM TO SWAP THE NUMBERS.

FOR EXAMPLE

Input	Result
10 20	20 10

PROGRAM

```
#include<stdio.h>in
t main()
{
inta;
int b;
int temp;
scanf("%d %d",&a,&b);
/*swappingthetwonumbers*/
temp=a;
a=b;
b=tem
p;
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:

ELIGIBILITYCRITERIA

WRITEACPROGRAMTOFINDTHEELIGIBILITYOFADMISSIONFORAPROFESSIONAL COURSE BASED ON THE FOLLOWING CRITERIA:

MARKS IN MATHS >= 65

MARKS IN PHYSICS >= 55

MARKSINCHEMISTRY>=50

OR

TOTALINALLTHREESUBJECTS>=180

SAMPLETESTCASES:

TEST CASE 1:

INPUT

706080

OUTPUT

THECANDIDATEISELIGIBLE

TESTCASE2:

INPUT

508080

OUTPUT

THECANDIDATEISELIGIBLE

TESTCASE3INP

UT

506040

OUTPUT

THECANDIDATEISNOTELIGIBLE

PROGRAM

```
#include<stdio.h>in

t main()
{
    intmark1;
    intmark2;
    intmark3;
    int total;
    scanf("%d%d%d",&mark1,&mark2,&mar
    k3); 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{
        printf("The candidate is not eligible");
    }
}
```

OUTPUT

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

Passed all tests! ✔

EXPERIMENTNO:1.3`DATE:

GROCERYITEMS

MALINI GOES TO BESTSAVE HYPER MARKET TO BUY GROCERY ITEMS. BESTSAVE HYPERMARKETPROVIDES10% DISCOUNTONTHEBILLAMOUNTBWHENEVERTHE BILL AMOUNT B IS MORE THAN RS.2000.

THEBILLAMOUNTBISPASSEDASTHEINPUTTOTHEPROGRAM.THEPROGRAM MUST PRINT THE FINAL AMOUNT A PAYABLE BY MALINI.

INPUTFORMAT:

THEFIRSTLINEDENOTESTHEVALUEOFB.

OUTPUTFORMAT:

THEFIRSTLINECONTAINSTHEVALUEOFTHEFINALPAYABLEAMOUNT A.

EXAMPLEINPUT/

OUTPUT1:INPUT:

1900

OUTPUT:

1900

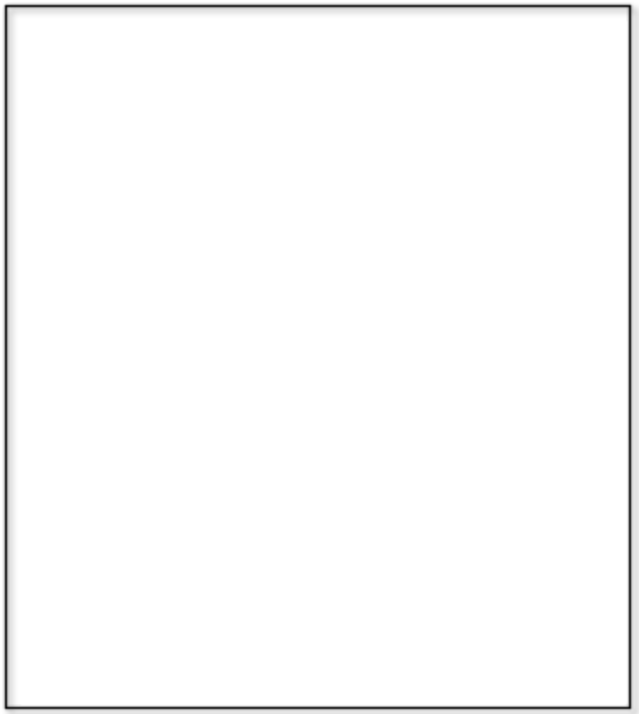
EXAMPLEINPUT/

OUTPUT2:INPUT:

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:1.4DATE:

BABA'SGIVINGPATTERN

BABA IS VERY KIND TO BEGGARS AND EVERY DAY BABA DONATES HALF OF THE
AMOUNTHEHASWHENEVERABEGGARREQUESTSHIM.THEMONEYMLEFTINBA
BA'S HAND IS PASSED AS THE INPUT AND THE NUMBER OF BEGGARS B
WHO RECEIVED THE
ALMSAREPASSEDASTHEINPUT.THEPROGRAMMUSTPRINTTHEMONEYBABAH
ADIN THE BEGINNING OF THE DAY.

INPUTFORMAT:

THE FIRST LINE DENOTES THE VALUE OF
M.
THESECONDLINEDENOTESTHEVALUEOFB
.

OUTPUTFORMAT:

THEFIRSTLINEDENOTESTHEVALUEOFMONEYWITHBABAINTHEBEGINNINGOF
THE DAY.

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;
    intbeggar;
    int amount;
    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:1.5DATE:

PUNCTUALITYINCENTIVE

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

INPUTFORMAT:

THE FIRST LINE DENOTES THE VALUE OF
I.
THESECONDLINEDENOTESTHEVALUEOFN
.

OUTPUTFORMAT:

THEFIRSTLINEDENOTESTHEVALUEOFP.

EXAMPLEINPUT/OUTPUT:

INPUT:

500
3

OUTPUT:

2100

EXPLANATION:

ONMONDAYTHEEMPLOYEERECEIVESRS.500,ONTUESDAYRS.700,ONWEDNE
SDAY RS.900

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+20
         0;

   }
   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:1.6DATE:

DIVISIBILITYFINDER

TWONUMBERSMANDNAREPASSEDASTHEINPUT.ANUMBERXISALSOPASSEDA S THE INPUT. THE PROGRAM MUST PRINTTHENUMBERSDIVISIBLEBYXFROMNTOM (INCLUSIVE OF M AND N).

INPUTFORMAT:

THE FIRST LINE DENOTES THE VALUE OF
M
THESECONDLINEDENOTESTHEVALUEOFN
THE THIRD LINE DENOTES THE VALUE OF
X

OUTPUTFORMAT:

NUMBERSDIVISIBLEBYXFROMNTOM,WITHEACHNUMBERSEPARATEDBYA
SPACE.

BOUNDARYCONDITIONS:

1<=M<=99999
99 M < N <=
9999999 1<=
X <= 9999

EXAMPLEINPUT/OUTPUT1:

INPUT:
2
40
7

OUTPUT:
352821147

EXAMPLEINPUT/OUTPUT2:

INPUT:
66
121
11

OUTPUT:

12111099887766

PROGRAM

```
#include<stdio.h>in
t main()
{
    intm;
    intn;
    int x;
    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:1.7DATE:

QUOTIENT&REMAINDER

WRITEACPROGRAMTOFINDTHEQUOTIENT&REMAINDEROFGIVEN INTEGERS

FOREXAMPLE

Input	Result
12 3	4 0

PROGRAM

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

OUTPUT

	Input	Expected	Got	
✔	12 3	4 0	4 0	✔

Passed all tests! ✔

EXPERIMENTNO:1.8DATE:

GREATESTOFALLNUMBERS

WRITEACPROGRAMTOFINDTHEGREATESTNUMBERSOF3INTEGERS.

FOREXAMPLE

Input	Result
10 20 30	30

PROGRAM

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

    if(a>b &&a>c){
        printf("% d",a);
    }
    elseif(b>c&&b>a)
        { printf("% d",b);
    }
    else
    printf("% d",c);
```

OUTPUT

	Input	Expected	Got	
✔	10 20 30	30	30	✔

Passed all tests! ✔

EXPERIMENTNO:1.9DATE:

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:1.10DATE:

FACTORIALOFANUMBER

WRITEAPROGRAMTOFINDTHEFACTORIALOFANUMBER

FOREXAMPLE

Input	Result
5	120

PROGRAM

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

OUTPUT

	Input	Expected	Got	
✔	5	120	120	✔

Passed all tests! ✔

EXPERIMENTNO:1.11DATE:

Input	Result
3	6

SUM OF N NATURAL

NUMBERSWRITEACPROGRAMTOFINDTHESUMOFNNATUR

ALNUMBERS FOR EXAMPLE

PROGRAM

```
#include<stdio.h>
int main(){
    int number;
    scanf("%d",&number);
    int i;
    intsum;
    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:1.12DATE:

FIBONACCISERIES

WRITEACPROGRAMTOFINDTHENTHTERMOFFIBONACCISERIES

FOREXAMPLE

Input	Result
0	0
1	1
4	3

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

PROGRAM

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:1.13DATE:

POWEROFINTEGERS

WRITEACPROGRAMTOFINDTHEPOWEROFINTEGERS.

INPUT:

AB

OUTPUT:

A^BVALUE

FOREXAMPLE

Input	Result
2 5	32

PROGRAM

```
#include<stdio.h>
#include<math.h>i
nt main()
{
    inta;
    int b;
    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:1.14DATE:

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");
    }
    elseif(number%number==0&&number/
        number==1){ printf("Prime");
    }
    else
    printf("Prime");
```

OUTPU

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

Passed all tests! ✔

EXPERIMENTNO:1.15DATE:

REVERSEOFANINTEGER

WRITEACPROGRAMTOFINDTHEREVERSEOFANINTEGER.

PROGRAM

```
#include<stdio.h>in
t main()
{
      int n;
      scanf("%d",&n);
       int reverse;
      reverse=0;
      int last;
      last=0;
      while(n!=0)
      { last=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 TIME COMPLEXITYOFALGORITHMS

EXPERIMENTNO:2.1DATE:

COUNTERMETHOD- WHILELOOP

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIME COMPLEXITY USING THE COUNTER METHOD.

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

NOTE:NONEEDOFCOUNTERINCREMENTFORDECLARATIONSANDSCANF()AND COUNT VARIABLE PRINTF() STATEMENTS.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLEFOREXAMPLE:

INPUT	RESULT
9	12

PROGRAM

```
#include<stdio.h>in
t main(){
intcount=0; int
n;
scanf("%d",&n);
int i=1;
count++
; ints=1;
count++
;
while(s<=n){ count+
+;
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:2.2DATE:

COUNTERMETHOD- FORLOOP

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIME COMPLEXITY USING THE COUNTER METHOD.

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

NOTE:

NONEEDOFCOUNTERINCREMENTFORDECLARATIONSANDSCANF()ANDCOUNT VARIABLE PRINTF() STATEMENTS.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE

PROGRAM

```
#include<stdio.h>int
main()
{
        int count=0; int
        n;
        scanf("%d",&n);
         if(n==1){
            count++;
            //printf("*");
        }
        //count++;
        else{
            count++;
            for(inti=1;i<=n;i++)
            {
                count++;
                for(intj=1;j<=n;j++)
                {
                    count++;
                    //printf("*"); count++;
                    //printf("*");
                    count++;
                    break; count+
                    +;
                }
                count++;
            }count++;
        }
        printf("%d",count);
    }
```

OUTPUT

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

Passed all tests! ✔

EXPERIMENTNO:2.3DATE:

COUNTERMETHOD- FACTORS

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIME COMPLEXITY USING COUNTER METHOD.

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

NOTE:

NONEEDOFCOUNTERINCREMENTFORDECLARATIONSANDSCANF()ANDCOUNTER

VARIABLE PRINTF() STATEMENT.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE

PROGRAM

```
#include<stdio.h>i
nt main()
{
    int num;
    scanf("%d",&num);
    int 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:2.4DATE:

COUNTERMETHOD- FUNCTION

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIME COMPLEXITY USING COUNTER METHOD.

```
voidfunction(intn)

{
   intc=0;

   for(int i=n/2; i<n; i++)

      for(intj=1;j<n;j=2*j)

         for(intk=1;k<n;k=k*2) c++;
}
```

NOTE:

NONEEDOFCOUNTERINCREMENTFORDECLARATIONSANDSCANF()ANDCOUNT VARIABLE PRINTF() STATEMENTS.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE

PROGRAM

```
#include<stdio.h>in
t main()
{
    int n;
    scanf("% d",&n);
     int count=0;
    intc=0;
    count+
    +;
    for(inti=n/2;i<n;i++){ count++;
        for(intj=1;j<n;j=2*j){ count++;
            for(intk=1;k<n;k=k*2)
                { count++;
                c++;
                count++;
            }
            count++;
        }
        count++;
    }
    count++;
    printf("% d",count);
}
```

OUTPUT

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

Passed all tests! ✔

EXPERIMENTNO:2.5DATE:

COUNTERMETHOD- REVERSE

CONVERTTHEFOLLOWINGALGORITHMINTOAPROGRAMANDFINDITSTIME COMPLEXITY USING COUNTER METHOD.

```
void reverse(int n)

{
  intrev=0,remainder;

  while (n != 0)
   {
      remainder = n %  10;

      rev=rev*10+remainder;

       n/= 10;
   }

print(rev);

}
```

NOTE:

NONEEDOFCOUNTERINCREMENTFORDECLARATIONSANDSCANF()ANDCOUNT VARIABLE PRINTF() STATEMENTS.

INPUT:

APOSITIVEINTEGERN

OUTPUT:

PRINTTHEVALUEOFTHECOUNTERVARIABLE

PROGRAM

```
#include<stdio.h>in
t main()
{
    int n;
    scanf("%d",&n);
     int count=0;
    intc=0;
    count+
    +;
    for(inti=n/2;i<n;i++){ count++;
        for(intj=1;j<n;j=2*j){ count+
            +;
            for(intk=1;k<n;k=k*2)
                { count++;
                c++;
                count++;
            }
            count++;
        }
        count++;
    }
    count++;
    printf("%d",count);
}
```

OUTPUT

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

Passed all tests! ✔

WEEK03– DIVIDE AND CONQUER

EXPERIMENTNO:3.1DATE:

NUMBEROFZEROSINANARRAY

PROBLEMSTATEMENT

GIVENANARRAYOF1SAND0STHISHASALL1SFIRSTFOLLOWEDBYALL0S.AIMIS TO FIND THE NUMBER OF 0S. WRITE A PROGRAM USING DIVIDE AND CONQUER TO COUNT THE NUMBER OF ZEROES IN THE GIVEN ARRAY.

INPUTFORMAT

FIRSTLINECONTAINSINTEGERM– SIZEOFARRAY

NEXTMLINESCONTAINSMNUMBERS– ELEMENTSOFANARRAY

OUTPUTFORMAT

FIRSTLINECONTAINSINTEGER– NUMBEROFZEROESPRESENTINTHEGIVEN ARRAY.

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

PROGRAM

```
{
```

```
        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	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:3.2DATE:

MAJORITYELEMENT

GIVENANARRAYNUMSOFSIZEN,RETURNTHEMAJORITYELEMENT.

THEMAJORITYELEMENTISTHEELEMENTTHATAPPEARSMORETHAN N/2 TIMES.
YOUMAYASSUMETHATTHEMAJORITYELEMENTALWAYSEXISTSINTHEARRAY.

EXAMPLE1:

INPUT:NUMS=[3,2,3]

OUTPUT:3

EXAMPLE2:

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

OUTPUT:2

CONSTRAINTS:

N==NUMS.LENGT

H 1<= 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);
     int a[n];
    for(int i=0;i<n;i++)
        { scanf("% d",&a[i]);
    }
    for(inti=0;i<n;i++){ int
        count=0;
        for(intj=0;j<n;j++)
            { if(a[i]==a[j]){
                count++;
            }
        }
        if(count>n/2){
            printf("% d",a[i]); break;
        }
    }
}
```

OUTPUT

	Input	Expected	Got	
✔	3 3 2 3	3	3	✔

Passed all tests! ✔

EXPERIMENTNO 3 :3DATE:

FINDINGFLOORVALUE

PROBLEMSTATEMENT:

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

GIVEN A SORTED ARRAY AND A VALUE X, THE FLOOR OF X IS THE LARGEST ELEMENTINARRAYSMALLERTHANOREQUALTOX.WRITEDIVIDEANDCONQUER ALGORITHM TO FIND FLOOR OF X.

INPUTFORMAT

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

OUTPUTFORMAT

FIRSTLINECONTAINSINTEGER– FLOORVALUEFOR X

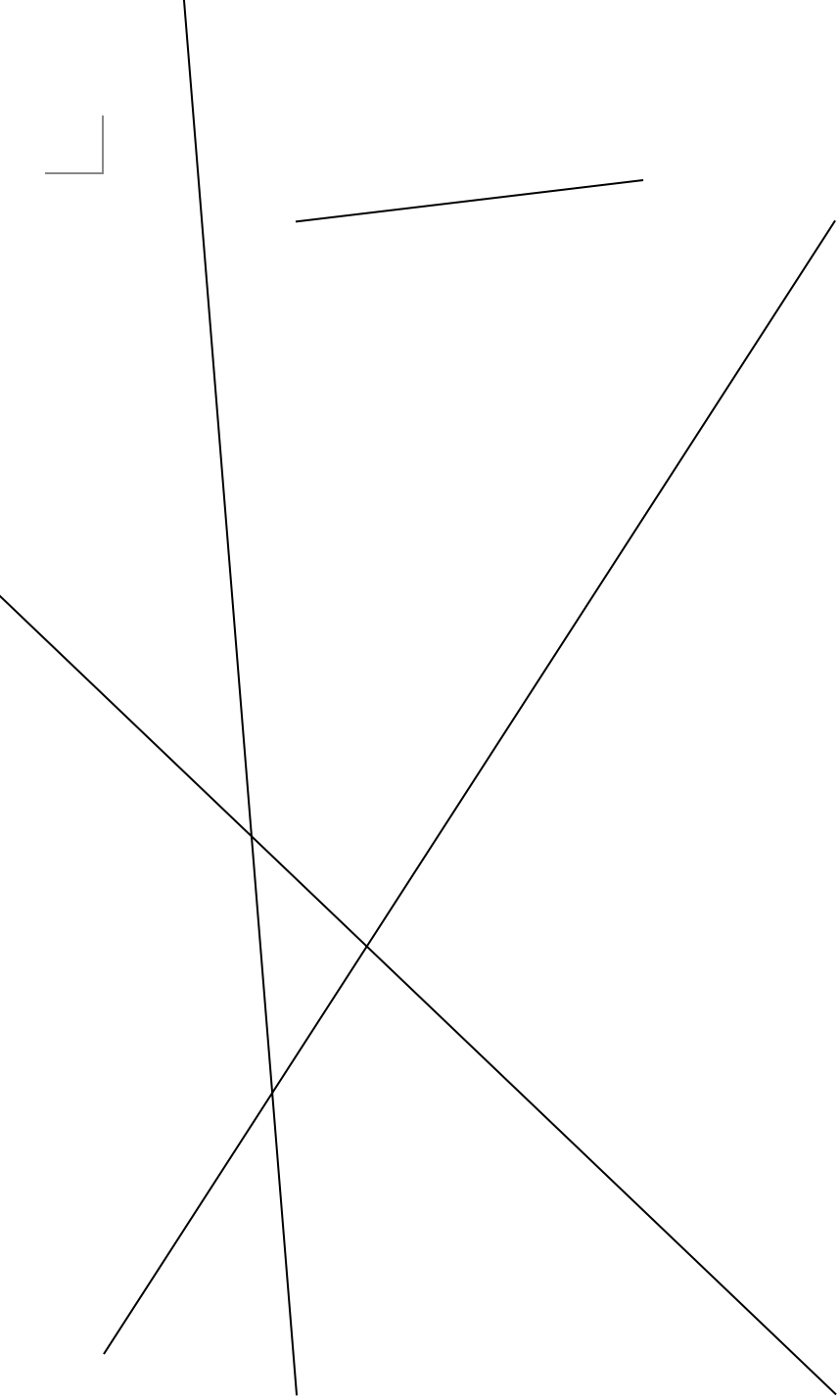
PROGRAM

```
            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:3.4DATE:

TWOELEMENTSSUMTOX

PROBLEMSTATEMENT:

GIVEN A SORTED ARRAY OF INTEGERS SAY ARR[] AND A NUMBER X. WRITE A RECURSIVEPROGRAMUSINGDIVIDEANDCONQUERSTRATEGYTOCHECKIFTHERE EXIST TWO ELEMENTS IN THE ARRAY WHOSE SUM = X. IF THERE EXIST SUCH TWO ELEMENTS THEN RETURN THE NUMBERS, OTHERWISE PRINT AS " NO" .

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

NOTE:WRITEADIVIDEANDCONQUERSOLUTION

INPUTFORMAT

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

OUTPUTFORMAT

- FIRSTLINECONTAINSINTEGER– ELEMENT1
- SECONDLINECONTAINSINTEGER– ELEMENT2(ELEMENT1ANDELEMENTS2 TOGETHER SUMS TO VALUE " X")

PROGRAM

```
    intflag; int
    x;
    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:3.5DATE:

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>int
main() {
    int n;
    scanf("%d", &n);
    int arr[n];
    for(inti=0;i<n;i++){ scanf("%d", &arr[i]);
    }
    for(inti=0;i<n-1;i++){
        for(int j=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(inti=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– GREEDY ALGORITHMS

EXPERIMENTNO:4.1DATE:

COIN PROBLEM

WRITEAPROGRAMTOTAKEVALUEVANDWEWANTTOMAKECHANGEFORVRS, AND WE HAVE INFINITE SUPPLY OF EACH OF THE DENOMINATIONS IN INDIAN CURRENCY, 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 NOTES NEEDED TO MAKE THE CHANGE.

INPUTFORMAT:

TAKEANINTEGERFROMSTDIN.

OUTPUTFORMAT:

PRINTTHEINTEGERWHICHISCHANGEOFTHENUMBER.

EXAMPLEINPUT:

64

```
#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:4.2DATE:

COOKIESPROBLEM

ASSUMEYOUAREANAWESOMEPARENTANDWANTTOGIVEYOURCHILDRENSOME COOKIES. BUT, YOU SHOULD GIVE EACH CHILD AT MOST ONE COOKIE.

EACHCHILDIHASAGREEDFACTORG[I],WHICHISTHEMINIMUMSIZEOFACOOKIE THAT THE CHILD WILL BE CONTENT WITH; AND EACH COOKIE J HAS A SIZE S[J]. IF S[J]>=G[I],WECANASSIGNTHECOOKIEJTOTHECHILDI,ANDTHECHILDIWILLBE CONTENT.YOURGOALISTOMAXIMIZETHENUMBEROFYOURCONTENTCHILDREN AND OUTPUT THE MAXIMUM NUMBER.

EXAMPLE1:

INPUT:

3

123

2

11

OUTPUT:

1

EXPLANATION:

- YOUHAVE3CHILDRENAND2COOKIES.THEGREEDFACTORSOF3CHILDREN ARE 1, 2, 3.
- ANDEVENTHOUGHYOUHAVE2COOKIES,SINCETHEIRSIZEISBOTH1,YOU COULD ONLY MAKE THE CHILD WHOSE GREED FACTOR IS 1 CONTENT.

- YOUNEEDTOOUTPUT1.

<u>CONSTRAINTS:</u>

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;
            }
        }
    }
    inti=0;
    intj=0;
    intcontents=0;
    while(i<n&&j<m){
        if(cookiesize[j]>=greedfactor[i]){ contents++;
            i++;
        } j+
        +;
    }
    printf("%d\n",contents);
    return 0;
}
```

OUTPUT

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

Passed all tests! ✔

EXPERIMENTNO:4.3DATE:

BURGERPROBLEM

APERSONNEEDSTOEATBURGERS.EACHBURGERCONTAINSACOUNTOFCALORIE.
AFTEREATINGTHEBURGER,THEPERSONNEEDSTORUNADISTANCETOBURNOUT HIS CALORIES. IF HE HAS EATEN I BURGERS WITH C CALORIES EACH, THEN HE HAS
TORUNATLEAST3I*CKILOMETERSTOBURNOUTTHECALORIES.FOREXAMPLE, IF HE ATE 3 BURGERS WITH THE COUNT OF CALORIE IN THE ORDER: [1, 3, 2], THE KILOMETERS HE NEEDS TO RUN ARE (30 * 1) + (31 * 3) + (32 * 2) = 1 + 9 +

18 = 28.BUT THISISNOTTHEMINIMUM,SONEEDTOTRYOUTOTHERORDERSOFCONSUMPTION AND CHOOSE THE MINIMUM VALUE. DETERMINE THE MINIMUM DISTANCE .HE NEEDS TO RUN. NOTE: HE CAN EAT BURGER IN ANY ORDER AND USE AN EFFICIENT SORTING ALGORITHM.APPLY GREEDY APPROACH TO SOLVE THE PROBLEM.

INPUTFORMAT

- FIRSTLINECONTAINSTHENUMBEROFBURGERS
- SECONDLINECONTAINSCALORIESOFEACHBURGERWHICHISN SPACE- SEPARATE INTEGERS

OUTPUTFORMAT

- PRINT:MINIMUMNUMBEROFKILOMETERSNEEDEDTORUNTOBURNOUT THE 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);
	int a[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])
				{ inttemp=a[j];
				a[j]=a[j+1];
				a[j+1]=temp;
			}
		}
	}
	intj=n-1;
	intsum=0;
	for(int i=0;i<n;i++){ sum=sum+((
		pow(n,i))*a[j]); j--;
	}
	printf("%d",sum);
}
```

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! ✔

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

EXPERIMENTNO:4.4DATE:

ARRAYSUMMAXPROBLEM

GIVENANARRAYOFNINTEGER,WEHAVETOMAXIMIZETHESUMOFARR[I]*I, WHERE I IS THE INDEX OF THE ELEMENT (I = 0, 1, 2, ..., N).WRITE AN ALGORITHM BASED ON GREEDY TECHNIQUE WITH A COMPLEXITY O(NLOGN).

INPUTFORMAT:

- FIRSTLINESPECIFIESTHENUMBEROFELEMENTS- N
- THENEXTNLINESCONTAINTHEARRAYELEMENTS.

OUTPUTFORMAT:

MAXIMUMARRAYSUMTOBEPRINTED.

SAMPLEINPUT:

5

25340

SAMPLEOUTPUT:

40

PROGRAM

```
            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;
            }
        }
}

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! ✔

```
#include
<stdio.h>#include<st
dlib.h>int main() {
    int n;
    scanf("%d",&n);
    intarrayOne[n];
    int arrayTwo[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]) {
```

EXPERIMENTNO:4.5DATE:

PRODCUTOFARRAYELEMENTS- MIN

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

FOREXAMPLE

Input	Result
3	28
1	
2	
3	
4	
5	
6	

PROGRAM

```
int temp=arrayTwo[j];
arrayTwo[j]=arrayTwo[j+1]
; arrayTwo[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 – 05

PLAYINGWITHNUMBERS

EXPERIMENTNO:5.1DATE:

PLAYINGWITHNUMBERS

PLAYINGWITHNUMBERS:

RAM AND SITA ARE PLAYING WITH NUMBERS BY GIVING PUZZLES TO EACH OTHER.NOW ITWASRAMTERM,SOHEGAVESITAAPOSITIVEINTEGER' N' AND TWONUMBERS1AND3.HEASKEDHERTOFINDTHEPOSSIBLEWAYSBYWHICH THE NUMBER N CAN BE REPRESENTED USING 1 AND 3.WRITE ANY EFFICIENT ALGORITHM TO FIND THE POSSIBLE WAYS.

EXAMPLE1:

INPUT:

6

OUTPUT:

6

EXPLANATION:

THEREARE6WAYSTO6REPRESENTNUMBERWITH1AND3

1+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’ CANBEREPRESENTEDUSING 1AND3

SAMPLEINPUT

6

SAMPLEOUTPUT

6

PROGRAM

```
#include<stdio.h>int
main() {
    long n;
    scanf("%ld",&n); if
    (n<0) {
        return 0;
    }
    longarray[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	243828195967216 29	243828195967216 29	✔

Passed all tests! ✔

EXPERIMENTNO:5.2DATE:

PLAYINGWITHCHESSBOARDP

LAYING WITH CHESSBOARD:

RAM IS GIVEN WITH AN N*N CHESSBOARD WITH EACH CELL WITH A MONETARY VALUE. RAM STANDS AT THE (0,0), THAT THE POSITION OF THE TOP LEFT WHITE ROOK. HE IS BEEN GIVEN A TASK TO REACH THE BOTTOM RIGHT BLACK ROOK POSITION (N- 1, N- 1) CONSTRAINED THAT HE NEEDS TO REACH THE POSITION BY TRAVELINGTHEMAXIMUMMONETARYPATHUNDERTHECONDITIONTHATHECAN ONLY TRAVEL ONE STEP RIGHT OR ONE STEP DOWN THE BOARD. HELP RAM TO ACHIEVE IT BY PROVIDING AN EFFICIENT DP ALGORITHM.

EXAMPLE:

INPUT

3

124

234

871

OUTPUT:

19

EXPLANATION:

TOTALLYTHEREWILLBE6PATHSAMONGTHATTHEOPTIMALIS

OPTIMAL PATH VALUE:1+2+8+7+1=19

INPUTFORMAT

- FIRSTLINECONTAINSTHEINTEGERN
- THENEXTNLINESCONTAINTHEN*NCHESSBOARDVALUES

OUTPUTFORMAT

PRINTMAXIMUMMONETARYVALUEOFTHE PATH

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:5.3DATE:

LONGESTCOMMONSUBSEQUENCE

GIVENTWOSTRINGSFINDTHELENGTHOFTHECOMMONLONGEST SUBSEQUENCE(NEED NOT BE CONTIGUOUS) BETWEEN THE TWO.

EXAMPLE:

S1:GGTABE

S2:TGATASB

S1:	AG	G	T	A	B	
S2:	GX	T	X	A	Y	B

THELENGTHIS4

SOLVINGITUSINGDYNAMICPROGRAMMING

FOREXAMPLE:

Input	Result
aab azb	2

PROGRAM

```
#include
<stdio.h>#include<string.h
>

intlongestCommonSubsequence(char*s1,char*s2){ int
    m = strlen(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", length);

    return0;
}
```

<u>OUTPUT</u>

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

Passed all tests! ✔

```
#include<stdio.h>
intlongseq(intarr[],intn){ int dp[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;
                }
        }
```

EXPERIMENTNO:5.4DATE:

LONGESTNON- DECREASINGSUBSEQUENCE

PROBLEMSTATEMENT:

FINDTHELENGTHOFTHELONGESTNON- DECREASINGSUBSEQUENCEINAGIVEN SEQUENCE.

EXAMPLE:

INPUT:

9

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

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

OUTPUT:

6

PROGRAM

}

```
    int maximumlength=0;
    for(inti=0;i<n;i++){
        if(dp[i]>maximumlength)
            { maximumlength=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",length);

    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

EXPERIMENT NO :6.1DATE :

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

FINDDUPLICATEINARRAY.

- GIVENAREADONLYARRAYOFNINTEGERSBETWEEN1ANDN,FINDONE NUMBER THAT REPEATS.

INPUTFORMAT:

- FIRSTLINE- NUMBEROFELEMENTS
- NLINES- N ELEMENTS

OUTPUTFORMAT:

ELEMENTX-THATISREPEATED

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

FOREXAMPLE:

Input	Result
5 1 1 2 3 4	1

PROGRAM

```
for(i=0;i<n;i++
)
```

```
    {
        scanf("%d",&arr[i]);
    }
    for(i=0;i<n;i++){ count=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 2DATE:

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

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

FIND DUPLICATE IN ARRAY.

- GIVEN A READ ONLY ARRAY OF N INTEGERS BETWEEN 1 AND N, FIND ONE NUMBER THAT REPEATS.

INPUT FORMAT:

- FIRST LINE- NUMBER OF ELEMENTS
- N LINES- N ELEMENTS

OUTPUT FORMAT:

- ELEMENT X- THAT IS REPEATED

FOR EXAMPLE:

Input	Result
5 1 1 2 3 4	1

PROGRAM

```
    for(i=0;i<n;i++){ count=
        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:6.3DATE:

PRINTINTERSECTIONOF2SORTEDARRAYS-O(M*N)TIMECOMPLEXITY,O(1)SPACE COMPLEXITY

FIND THE INTERSECTION OF TWO SORTED ARRAYS OR IN OTHER WORDS,

- GIVEN 2 SORTED ARRAYS, FIND ALL THE ELEMENTS WHIC HOCCUR IN BOTH THE ARRAYS.

INPUT FORMAT

· THE FIRST LINE CONTAINS T, THE NUMBER OF TEST CASES. FOLLOWING T LINES CONTAIN:

1. LINE 1 CONTAINS N1, FOLLOWED BY N1 INTEGERS OF THE FIRST ARRAY
2. LINE 2 CONTAINS N2, FOLLOWED BY N2 INTEGERS OF THE SECOND ARRAY

OUTPUT FORMAT

- THE INTERSECTION OF THE ARRAYS IN A SINGLE LINE

EXAMPLE

INPUT:

1

3 10 1 7 5 7

6 2 7 1 0 1 5 5 7 2 4 6

OUTPUT:

10 5 7

INPUT:

1

6 1 2 3 4 5 6

2 1 6

OUTPUT:

16

FOREXA

MPLE:

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){ int i = 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);
		int arr1[v1];
		for(inti=0;i<v1;i++){ scanf("%d",
			&arr1[i]);
		}
		int v2;
		scanf("%d",&v2);
		int arr2[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:6.4DATE:

PRINTINTERSECTIONOF2SORTEDARRAYS-O(M+N)TIMECOMPLEXITY,O(1)SPACE COMPLEXITY

FIND THE INTERSECTION OF TWO SORTED ARRAYS OR IN OTHER WORDS,

- GIVEN 2 SORTED ARRAYS, FIND ALL THE ELEMENTS WHICH OCCUR IN BOTH THE ARRAYS.

INPUT FORMAT

· THE FIRST LINE CONTAINS T, THE NUMBER OF TEST CASES. FOLLOWING T LINES CONTAIN:

1. LINE 1 CONTAINS N1, FOLLOWED BY N1 INTEGERS OF THE FIRST ARRAY
2. LINE 2 CONTAINS N2, FOLLOWED BY N2 INTEGERS OF THE SECOND ARRAY

OUTPUT FORMAT

THE INTERSECTION OF THE ARRAYS IN A SINGLE LINE

EXAMPLE

INPUT:

1

3 10 17 57

6 2 7 10 15 57 2 4 6

OUTPUT:

10 57

INPUT:

1

6 1 2 3 4 5 6

2 1 6

OUTPUT:

```c
#include <stdio.h>
voidfindIntersection(intarr1[],intn1,intarr2[],intn2){ int i = 0, j = 0;
    while (i <n1 &&j <n2) {
        if (arr1[i] == arr2[j]) {
            printf("% d",arr1[i]); i++;
            j++;
        }elseif(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(inti=0;i<n1;i++){ scanf("% d",
            &arr1[i]);
        }
        int n2;
        scanf("% d",&n2);
        int arr2[n2];
        for(inti=0;i<n2;i++){ scanf("% d",
            &arr2[i]);
        }
        findIntersection(arr1, n1, arr2, n2);
    }
    return 0;
}
```

16

FOREXAMPLE:

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

OUTPUT

PROGRAM

	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! ✔

```
#include<stdio.h>int
main()
{
```

EXPERIMENTNO:6.5DATE:

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

GIVEN AN ARRAY A OF SORTED INTEGERS AND ANOTHER NON NEGATIVE INTEGERK,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

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

	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! ✔

OUTPUT

EXPERIMENTNO:6.6DATE:

PAIR WITH DIFFERENCE- O(N) TIME COMPLEXITY, O(1) SPACE COMPLEXITY

GIVEN AN ARRAY A OF SORTED INTEGERS AND ANOTHER NON NEGATIVE INTEGER K, FIND IF THERE EXISTS 2 INDICES I AND J SUCH THAT A[J] - A[I] = K, I != J.

INPUT FORMAT:

- FIRST LINE N- NUMBER OF ELEMENTS IN AN ARRAY
- NEXT N LINES- N ELEMENTS IN THE ARRAY
- K- NON- NEGATIVE INTEGER

OUTPUT FORMAT

- 1- IF PAIR EXISTS
- 0- IF NO PAIR EXISTS

EXPLANATION FOR THE GIVEN SAMPLE TEST CASE:

YES AS 5 - 1 = 4

SO RETURN 1.

FOR EXAMPLE

Input	Result
3 1 3 5 4	1

PROGRAM

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

	int array[n];
	for(inti=0;i<n;i++)
	{
```

```
        scanf("%d",&array[i]);
    }
    int d;
    scanf("%d",&d);
    int count=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! ✔