LAB VI

1.
```
/* This prog. reads from data files vecu.dat and vecv.dat*/
#include <stdio.h>
#include<math.h>
#define N 100
int main()
{
int m,n,i;
double a[N],b[N],da,db,s,tht;
FILE *inp1,*inp2,*outp;

outp=fopen("output.dat","w");
if(outp==NULL)
 {
  printf("Error in creating output.dat\n");
  return 0;
  }


inp1=fopen("vecu.dat","r");
if(inp1==NULL)
 {
  printf("Error in opening veca.dat\n");
  return 0;
  }

fscanf(inp1,"%d",&m);
for(i=0;i<m;i++)
   {
   fscanf(inp1,"%lf",&a[i]);
   }
fclose(inp1);
printf("The vector u is: ");
for(i=0;i<m;i++)
   {
    printf("%0.2lf   ",a[i]);
   }
   printf("\n");


inp2=fopen("vecv.dat","r");
if(inp2==NULL)
 {
  printf("Error in opening veca.dat\n");
  return 0;
  }

fscanf(inp2,"%d",&n);
for(i=0;i<n;i++)
   {
    fscanf(inp2,"%lf",&b[i]);
   }
```

```
fclose(inp2);

printf("The vector v is: ");
for(i=0;i<m;i++)
   {
    printf("%0.2lf   ",b[i]);
   }
   printf("\n");


da=0.0;
for(i=0;i<m;i++)
   da +=a[i]*a[i];

da=sqrt(da);

db=0.0;
for(i=0;i<n;i++)
   db +=b[i]*b[i];

db=sqrt(db);

fprintf(outp,"Lenghth of a = %0.3lf\n",da);
fprintf(outp,"Lenghth of b = %0.3lf\n",db);



if(m==n) {
s = 0.0;
for(i=0;i<m;i++)
   s +=a[i]*b[i];

tht=acos(s/(da*db));

fprintf(outp,"Angle between a & b is = %0.3lf degree\n",tht*180/M_PI);
}

return 0;
}
```

2.
```
/* This prog. writes 100 random nos between -1/2 & 1/2 in ran.dat*/
#include <stdio.h>
#include <stdlib.h>
#include<time.h>
#define N 100
int main()
{
int i;
double a;
FILE *outp;

outp=fopen("ran.dat","w");
```

```
if(outp==NULL)
 {
  printf("Error in creating output.dat\n");
  return 0;
  }

srand(time(NULL));

fprintf(outp,"%d\n",N);
for(i=1;i<=N;i++)
  {
   fprintf(outp,"%0.4lf\n",(double) rand()/RAND_MAX - 0.5);
  }

fclose(outp);

return 0;
}
```

3.
```
/* This prog. reads 100 random nos from ran.dat, computes the average
and number of values above average*/
#include <stdio.h>
#define N 1000
int main()
{
int i,n,nabav;
double a[N],s,avg;
FILE *inp;

inp=fopen("ran.dat","r");
if(inp==NULL)
 {
  printf("Error in opening ran.dat\n");
  return 0;
  }

fscanf(inp,"%d",&n);

if(n>N)
  {
    printf("Increase the size of the array\n");
    return 0;
  }


for(i=0;i<n;i++)
   {
    fscanf(inp,"%lf",&a[i]);
   }

fclose(inp);
```

```
n=i;
s = 0.0;
for(i=0;i<n;i++)
   {
    s+=a[i];
   }

avg = s/(double) n;

nabav=0;
for(i=0;i<n;i++)
   {
     if(a[i]>avg)
       {
        nabav++;
       }
   }

printf("Average value = %0.4lf\n",avg);
printf("Number of data above the average value = %d\n",nabav);


return 0;
}
```

4.
```
#include<stdio.h>
#include<stdlib.h>
#include<time.h>
int main()
{
int j,i,nhd5=0,nhd5_4=0,nhd,ntrial;
double y,h=0.5;
srand(time(NULL));
printf("Enter the number of trial: ");
scanf("%d",&ntrial);
for(i=1;i<=ntrial;i++)
{
  nhd=0;
  for(j=0;j<10;j++)
    {
      y=rand()/(double) RAND_MAX;
      if (y<=h)
          nhd++;
    }
if(nhd==5)
     nhd5++;

if(nhd==5 || nhd==4)
     nhd5_4++;
}
printf("Probability of five heads is = %0.4lf\n",(double)nhd5/ntrial);
printf("Probability of five heads or four is = %0.4lf\n",(double)nhd5_4/ntrial);
```

```
}
```