/\*newton's backward interpolation\*/

#include<stdio.h>

#include<conio.h>

float fact1(int);

int main()

{

float x[10],y[10][10],sum,p,u,temp;

int i,n,j,k=0,f,m;

printf("\n how many record you will be enter: ");

scanf("%d",&n);

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

{

printf("\n Enter the value of x%d: ",i);

scanf("%f",&x[i]);

printf("\n Enter the value of f(x%d): ",i);

scanf("%f",&y[k][i]);

}

printf("\n\n Enter x for finding f(x): ");

scanf("%f",&p);

for(i=1;i<n;i++)

{

for(j=i;j<n;j++)

{

y[i][j]=y[i-1][j]-y[i-1][j-1];

}

}

printf("\n-------------------------------------------------------------------------");

printf("\n x[i]\t y[i]\t y1(i)\t y2(i)\t y3(i)\t y4(i)");

printf("\n-------------------------------------------------------------------------");

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

{

printf("\n %.3f",x[i]);

for(j=0;j<=i;j++)

{

printf(" ");

printf(" %.3f",y[j][i]);

}

printf("\n");

}

i=0;

do

{

if(x[i]<p && p<x[i+1])

k=1;

else

i++;

}

while(k!=1);

f=i;

u=(p-x[f])/(x[f+1]-x[f]);

printf("\n\n u=%.3f",u);

n=n-i+1;

sum=0;

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

{

temp=1;

for(j=0;j<i;j++)

{

temp=temp\*(u-j);

}

m=fact1(i);

sum=sum+temp\*(y[i][f]/m);

}

printf("\n f(%.2f) = %f ",p,sum);

return 0;

}

float fact1(int a)

{

float fact=1;

if(a==1||a==0)

return 1;

else

fact=a\*fact1(a-1);

return fact;

}