

CP 111 Computer Programming, 2/2554, Section B01/B02

Programming Homework 05 Solution

1. Problem name: Cal_Integration_simpson

```
#include <stdio.h>
#include <math.h>
double poly_two(double k1, double k2, double k3, double x);
int main()
{
    double k1,k2,k3,a,b,coef;
    double c,x,y,sum,fa,fb;
    int i,n;

    scanf("%lf %lf %lf %lf %lf",&k1,&k2,&k3,&a,&b);
    n=100;
    c=(b-a)/n;
    sum=0;
    for(i=0;i<=n;i++)
    {
        x=a+c*i;
        y=poly_two(k1,k2,k3,x);
        if(i==0 || i==n)
            coef=1.0/3.0;
        else{
            if(i%2==0)
                coef=2.0/3.0;
            else
                coef=4.0/3.0;
        }
        sum=sum+y*coef*c;
    }
    printf("%.12f\n",sum);
    x=a;
    fa=(1.0/3.0)*k1*x*x*x+(1.0/2.0)*k2*x*x+k3*x;
    x=b;
    fb=(1.0/3.0)*k1*x*x*x+(1.0/2.0)*k2*x*x+k3*x;
    printf("%.12f\n",fb-fa);
    return 0;
}

double poly_two(double k1, double k2, double k3, double x)
{
    return(k1*x*x + k2*x + k3);
}
```

2. Problem name: cos_approx

```
#include <stdio.h>

double MyCos(double x, int n);

int main()
{
    double sin_x, x, xp, fact, y, y1, y2;
    int k, n;

    scanf("%lf %d", &x, &n);

    x=x*(3.1416/180);
    y=MyCos(x/2, n)+MyCos(x, n)+MyCos(2*x, n)+MyCos(4*x, n);
    printf("%.6f\n", y);
    return 0;
}

double MyCos(double x, int n)
{
    double cos_x, x2n, _2nfact;
    int k;

    x2n=1;
    _2nfact=1;
    cos_x=0;
    for(k=0; k<=n; k++)
    {
        if(k%2==0)
            cos_x=cos_x+(x2n/_2nfact);
        else
            cos_x=cos_x-(x2n/_2nfact);

        x2n=x2n*x*x;
        _2nfact=_2nfact*(2*k+1)*(2*k+2);
    }
    return(cos_x);
}
```

3. Problem name: OX_Figure

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

```
int main() {
    int n, m, k, i, j;
    char ch1, ch2;
    scanf("%d %d %d", &n, &m, &k);
    if(k==0){
        ch1='0';
        ch2='X';
    }
    else
    {
        ch1='X';
        ch2='0';
    }

    for (i = 0; i < m; i++)
    {
        for (j = 0; j < n; j++)
        {
            if ( (i + j) % 2 == 0)
                printf("%c", ch1);
            else
                printf("%c", ch2);
        }
        printf("\n");
    }
    return 0;
}
```

4. Problem name: sum_of_exp_gt_N

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

```
#include <math.h>
```

```
int main()
{
    int k;
    double N, sum;
    scanf("%lf", &N);
    sum=0;
    k=1;
    while(1)
    {
        sum = sum+exp((double)k/(double)(k+1));
        if(sum > N)
            break;
        k=k+1;
    }
    printf("%d\n", k);
    printf("%f\n", sum);
}
```

5. Problem name: projectile

```
#include <stdio.h>
int main()
{
    double u,sx,sy,dx;int nhits;

    scanf("%lf",&u);
    dx=0;
    nhits=0;
    while(1)
    {
        sx=u*u/10.0;
        sy=u*u/40.0;
        dx=dx+sx;
        nhits=nhits+1;
        if(sy<0.01)
            break;
        u=(3.0/5.0)*u;
    }
    printf("%.4f\n",dx);
    printf("%d\n",nhits);
    return 0;
}
```

6. Problem name: Euclid_GCD

```
#include <stdio.h>
int Euclid_GCD(int,int);
int main()
{
    int m,n,gcd;

    scanf("%d %d",&m,&n);
    gcd=Euclid_GCD(m,n);
    printf("%d\n",gcd);
    return 0;
}
int Euclid_GCD(int m,int n)
{
    int r;

    if(m<n)
    {
        r=m;
        m=n;
        n=r;
    }
    while(n>0)
    {
        r=m%n;
        m=n;
        n=r;
    }
    return (m);
}
```