

```

1  #include <stdio.h>
2  #include <stdlib.h>
3  #include <string.h>
4  #include <math.h>
5  #include "mcc_generated_files/mcc.h"
6
7  /*
8   * | | | | | Main application
9   */
10 void main()
11 {
12     SYSTEM_Initialize();
13
14     float a=1,b=3; //limits of integration
15     int i=0;
16
17     int n=100; //number from Simpson's Rule
18
19     float deltax= (b-a)/n; //delta x for the approximated integral solution
20
21     printf("\n\n\n deltax is: %f", deltax);
22
23     float X=0, Xl=0, Xn=0, sum1=0, sum2=0; // the Simpson's rule terms up to f of Xn
24
25     for(i=0;i<n+1;i++)
26     {
27         /*Xl=0.5*i;
28         printf(" \n Xl is: %f", Xl);
29         */
30
31         if(i==0)
32         {
33             Xl= 0.5*a;
34             printf("\n\n Xl is: %f", Xl);
35         }
36
37         else
38         {
39             if(i==n)
40             {
41                 Xn=0.5*b;
42                 printf("\n\n Xn is: %f", Xn);
43             }
44             else
45             {
46                 if(i%2 == 0)
47                 {
48                     sum1 += 2*0.5*(a+(i*(b-a)/n));
49                 }
50                 else
51                 {
52                     sum2 += 4*0.5*(a+(i*(b-a)/n)) ;
53                 }
54             }
55
56             //printf("\n sum 1 is: %f \n sum2 is: %f ", sum1, sum2);
57         }
58     }

```

```

30
31     if(i==0)
32     {
33         Xl= 0.5*a;
34         printf("\n\r Xl is: %f", Xl);
35     }
36
37     else
38     {
39         if(i==n)
40         {
41
42             Xn=0.5*b;
43             printf("\n\r Xn is: %f", Xn);
44         }
45         else
46         {
47             if(i%2 == 0)
48             {
49                 sum1 += 2*0.5*(a+(i*(b-a)/n));
50             }
51             else
52             {
53                 sum2 += 4*0.5*(a+(i*(b-a)/n)) ;
54             }
55
56             //printf("\n sum 1 is: %f \n sum2 is: %f ", sum1, sum2);
57         }
58     }
59
60 }
61
62 printf("\n\r sum 1 is: %f \n\r sum2 is: %f ", sum1, sum2);
63
64 /*for(i=n;i<n+1;i++)
65 {
66     Xn= 0.5*b;
67     printf("\n\r Xn is: %f", Xn);
68 }
69 */
70 float area, sum3;
71
72 sum3= Xl + Xn + sum1 + sum2;
73
74 area = sum3* deltax/3;
75
76
77 printf("sum3 is: %f",sum3);
78 printf("\n\r The area under the function using Simpson's Rule is: %f",area);
79
80
81 while (1)
82 {
83 }
84
85 }

```

```
Xl is: 0.500000
Xn is: 1.500000
sum 1 is: 195.999969
sum2 is: 100.000015
The area under the function using Simpson's Rule is: 1.320000
```

```
deltax is: 0.020000
Xl is: 0.500000
Xl is: 0.500000
Xn is: 1.500000
sum 1 is: 195.999969
sum2 is: 100.000015
The area under the function using Simpson's Rule is: 1.320000
```

```
deltax is: 0.020000
Xl is: 0.500000
Xn is: 1.500000
sum 1 is: 97.999984
sum2 is: 200.000030
The area under the function using Simpson's Rule is: 0.666667
```

```
deltax is: 0.020000
Xl is: 0.500000
Xn is: 1.500000
sum 1 is: 97.999984
sum2 is: 200.000030
The area under the function using Simpson's Rule is: 0.666667
```

```
deltax is: 0.020000
Xl is: 0.500000
Xn is: 1.500000
sum 1 is: 97.999984
sum2 is: 200.000030 sum3 is: 99.999984
The area under the function using Simpson's Rule is: 0.666667
```

```
deltax is: 0.020000
Xl is: 0.500000
Xn is: 1.500000
sum 1 is: 97.999984
sum2 is: 200.000030 sum3 is: 300.000000
The area under the function using Simpson's Rule is: 2.000000
```

Assignment\_2

- Header Files
- Important Files
- Linker Files
- Source Files
  - main.c
- MCC Generated Files
- Libraries
- Loadables
- Assignment1
- Assignment3
- Header Files
- Important Files
- Linker Files
- Source Files
- Libraries
- Loadables
- Exercise0
- Exercise1
- Exercise2
- Header Files
- Important Files
- Linker Files
- Source Files
  - main.c
- MCC Generated Files
- Libraries
- Loadables
- Exercise3
- Header Files
- Important Files
- Linker Files
- Source Files
  - main.c

Assignment\_2 - main() - Navig...

- Project Type: Application - Config...
- Device
  - PIC18F46K42
  - Checksum: 0x4990
  - CRC32: 0x90130477
- Packs
  - PIC18F4K\_DFP (1.4.87)
- Compiler Toolchain
  - XC8 (v2.30) [C:\Program Files\...
  - Production Image: Optimized
  - Device support information: P...
- Memory
  - Data 4,096 (0x1000) bytes
    - 13%
  - Data Used: 537 (0x219) Fr...
  - Program 65,536 (0x10000) byte...
  - 41%
  - Program Used: 26,544 (0x...
- Debug Tool
  - None (VID, PID)
- Debug Resources
  - Program BP Used: 0 Free: 0
  - Data BP: No Support
  - Data Capture BP: No Support
  - Unlimited BP (S/W): No Support

```
70 float area, sum3;
71
72
73 sum3= X1 + Xn + sum1 + sum2;
74
75
76 area = sum3* deltax/3;
77
78 printf("sum3 is: %f",sum3);
79 printf("\n\r The Area under the function using Simpson's Rule is: %f",area);
80
81
82
83
84 // #2
85
86 int l=0, sumL=0;
87 for(l=0;l<101;l++)
88 {
89     sumL += l;
90 }
91 printf("\n\r The Sum is %d", sumL);
92
93
94 // #1
95
96 int k=0;
97 float sumK=0;
98
99 for(k=0;k<21;k++)
100 {
101     sumK += pow(0.5,k);
102 }
103 printf("\n\r\n\r The Sum is %f", sumK);
104
105
106 while (1)
107 {
108 }
109
110
```

COM4 - PuTTY

```
The Sum is 5050
The Sum is 1.999999
```

Output x Notifications

Configuration Loading Error x Assignment\_2 (Build, Export Hex) x

```
make -f nbproject\Makefile-default.mk SUBPROJECTS= .build-conf
make[1]: Entering directory 'C:/MinGW/msys/1.0/home/manmo/Phys1600/Assignment_2.X'
make -f nbproject\Makefile-default.mk dist/default/production/Assignment_2.X.production.hex
make[2]: Entering directory 'C:/MinGW/msys/1.0/home/manmo/Phys1600/Assignment_2.X'
make[2]: 'dist/default/production/Assignment_2.X.production.hex' is up to date.
make[2]: Leaving directory 'C:/MinGW/msys/1.0/home/manmo/Phys1600/Assignment_2.X'
make[1]: Leaving directory 'C:/MinGW/msys/1.0/home/manmo/Phys1600/Assignment_2.X'

BUILD SUCCESSFUL (total time: 163ms)
Wrote hex image to "F:\a2.hex".
```