

ENG EK 125 - Worksheet C Chapter 4A

Name: Ande Chen

1) Write a program that will:

- prompt the user for an angle in degrees
- Call a function to calculate and return the angle in radians. (Note: π radians = 180°)
- Call a function to print the result

```
1  #include <stdio.h>
2  #define PI 3.1415
3
4  int main(){
5      float deg,
6          rad;
7
8      float deg2rad(float);
9      void print_angle(float, float);
10
11     printf("Enter an angle in degrees: ");
12     scanf("%f", &deg);
13
14     rad = deg2rad(deg);
15     print_angle(deg, rad);
16
17     return 0;
18 }
19
20 float deg2rad(float ang){
21     return (ang * PI) / 180;
22 }
23
24 void print_angle(float deg, float rad){
25     printf("%.1f degrees is %.1f radians.\n", deg, rad);
26 }
```

```
chena8@WIT45005546 /cygdrive/c
tro to Programming/C/WSC4A
$ ./WSC4A_1
Enter an angle in degrees: 90
90.0 degrees is 1.6 radians.
```

2) The conversion depends on the temperature and other factors, but an approximation is that 1 inch of rain is equivalent to 6.5 inches of snow. Write a program that prompts the user for the number of inches of rain, calls a function to return the equivalent amount of snow, and calls a function that prints this result.

```
1  #include <stdio.h>
2
3  int main(){
4      float rain,
5          snow;
6
7      float rain2snow(float);
8      void print_res(float, float);
9
10     printf("Enter inches of rainfall: ");
11     scanf("%f", &rain);
12
13     snow = rain2snow(rain);
14     print_res(rain, snow);
15
16     return 0;
17 }
18
19 float rain2snow(float rain){
20     return rain * 6.5;
21 }
22
23 void print_res(float rain, float snow){
24     printf("%.1f inches of rain is equal to %.1f inches of snow.\n", rain, snow);
25 }
```

```
chena8@WIT45005546 /cygdrive/c/Users/chena8/Document
tro to Programming/C/WSC4A
$ ./WSC4A_2
Enter inches of rainfall: 4
4.0 inches of rain is equal to 26.0 inches of snow.
```

3) In thermodynamics, the Carnot efficiency is the maximum possible efficiency of a heat engine operating between two reservoirs at different temperatures. The Carnot efficiency is given as

$$\eta = 1 - \frac{T_c}{T_h}$$

where T_c and T_h are the absolute temperatures at the cold and hot reservoirs, respectively. Write a program that will prompt the user for the two reservoir temperatures in Kelvin, call a function to calculate the Carnot efficiency, and then call a function to print the corresponding Carnot efficiency to 3 decimal places.

```
1  #include <stdio.h>
2
3  int main(){
4      float Tc,
5            Th,
6            carnotEff;
7
8      float calcCarnot(float, float);
9      void print_res(float);
10
11     printf("Enter the temperature of the cold reservoir(K): ");
12     scanf("%f", &Tc);
13     printf("Enter the temperature of the hot reservoir(K): ");
14     scanf("%f", &Th);
15
16     carnotEff = calcCarnot(Tc, Th);
17     print_res(carnotEff);
18
19     return 0;
20 }
21
22 float calcCarnot(float Tc, float Th){
23     return 1 - (float) (Tc/Th);
24 }
25
26 void print_res(float res){
27     printf("The Carnot efficiency of the heat engine is %.3f.\n", res);
28 }
```

```
chena8@WIT45005546 /cygdrive/c/Users/chena8/Documents
tro to Programming/C/WSC4A
$ ./WSC4A_3
Enter the temperature of the cold reservoir(K): 289
Enter the temperature of the hot reservoir(K): 312
The Carnot efficiency of the heat engine is 0.074.
```