Programming Assignment 7 - Due Wednesday 5 November

Problem: As a summer intern with a surveying company, you have been given the task of creating a C program that will transform compass headings in degrees to compass bearings. The program should ask for the compass heading in degrees and respond with the proper compass bearing.

Background: The relationship between a compass heading in degrees and a compass bearing is illustrated at the right. A compass heading is a specification in degrees, between 0 and 359.999..., with N(orth) being 0 degrees. The arrow in the illustration shows a compass heading of 240 degrees.

A compass bearing is given in terms of _face_, either north or south, _turn_ a specified number of degrees in _direction_, either east or west. Therefore, a compass bearing will look like

face (turn) direction

which is read as face _south_, _turn_ angle degrees to the _west_. Or, more succinctly, <u>face</u> <u>turn</u> degrees <u>direction</u>. Thus, the equivalent compass bearing in the illustration is <u>south</u> <u>60</u> degrees <u>west</u>.

The transformation table for converting compass headings into compass bearings is provided in the following table.
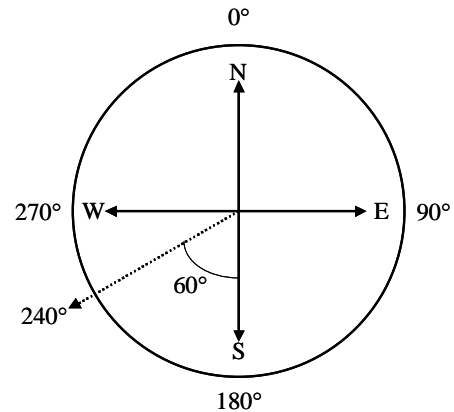
Heading (in degrees)	Bearing Computation
0 ≤ heading < 90	north (heading) east
90 ≤ heading < 180	south (180-heading) east
180 ≤ heading < 270	south (heading-180) west
270 ≤ heading < 360	north (360-heading) west

Assignment:

Create a C program/project "`pa07xxx`" for this problem. Your C program must have (1) `main` - with the algorithm section showing the logical progression of steps to solve the problem; (2) a header display function that provides programmer information and describes the purpose/result of the program; (3) a function to get the compass heading; (4) a function to compute the bearing (Note: the bearing consists of three variables. Hint: use a code for _face_, e.g., 1 = north, 2 = south, and _direction_.); and (4) a function to display the results.

In addition, your program must: (1) display header information and program description to the screen before asking for any information, and (2) allow for the user to repeat the program as many times as desired.

Turn in:
1. An outline of your program approach.
2. A paper copy of your C program.
3. A screen printout showing execution of your script for headings of 29 degrees, 149 degrees, 180 degrees, and 234 degrees.
4. A disk with your project.

Programming Assignment 07 - Evaluation Criteria

Names _____

Criteria	Points Available	Points Awarded
Program Style		
header in each function	10	
purpose/goal state in headers	10	
meaningful variable names	10	
variables defined w/ comment	10	
whitespace/readability	10	
algorithm comments	10	
organization	10	
Functions		
`main`	10	
header function	10	
get angle function	10	
compute bearing function	10	
display results function	10	
Program Function		
user interface	20	
angle input properly	10	
bearing computed properly	30	
program repeat loop	10	
Total Pts:		/190