

Assignment 7 - - Creating Mathematical Tables

Due Date: March 25, 2006 (11:59 pm)

This program will give you practice using repetition statements to generate a portion of a table of tangents (of angles measured in degrees), as shown in the sample output on the next page.

For each table, the values that will define the extent of the table are entered, then the table is generated. The values that the user provides are to be rounded to one decimal place before the corresponding table is generated, and before any decisions are made based upon the input.

Generation of tables should terminate when the user enters numbers that are in the wrong order, or that are outside the range 0.0 to 89.9 after rounding. Your prompts and your table of tangents do not need to appear exactly as they appear in the samples, but be sure to include all information shown, striving for neat, readable results. **Your program must have at least 3 functions, but you may use as many functions as you like.**

Note: All tangents are to be printed with at most 5 significant digits. See the second and third tables in the sample output for clarification. Be sure to determine the *least* number of decimal places you'll need to display. Use $\pi = 3.141592$ to convert degrees to radian.

use $\tan(\text{ang})$ from `math.h`

This is sample output for the program; user input is shown in **bold type**.

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Bob Brown - Computer Science 101 - Program 7

This program will generate tables of tangents.
Enter a number >= 90 or < 0, or numbers in the wrong order, to terminate.)

***      ***      ***      ***      ***      ***      ***      ***      ***      ***      ***
Minimum and maximum values for left column of table : 29.58 30.33
Partial Table of Tangents
  0      1      2      3      4      5      6      7      8      9
29.6 | 0.5681 0.5683 0.5685 0.5688 0.5690 0.5692 0.5695 0.5697 0.5699 0.5702
29.7 | 0.5704 0.5706 0.5709 0.5711 0.5713 0.5715 0.5718 0.5720 0.5722 0.5725
29.8 | 0.5727 0.5729 0.5732 0.5734 0.5736 0.5739 0.5741 0.5743 0.5746 0.5748
29.9 | 0.5750 0.5753 0.5755 0.5757 0.5760 0.5762 0.5764 0.5767 0.5769 0.5771
30.0 | 0.5774 0.5776 0.5778 0.5780 0.5783 0.5785 0.5787 0.5790 0.5792 0.5794
30.1 | 0.5797 0.5799 0.5801 0.5804 0.5806 0.5808 0.5811 0.5813 0.5815 0.5818
30.2 | 0.5820 0.5822 0.5825 0.5827 0.5829 0.5832 0.5834 0.5837 0.5839 0.5841
30.3 | 0.5844 0.5846 0.5848 0.5851 0.5853 0.5855 0.5858 0.5860 0.5862 0.5865

***      ***      ***      ***      ***      ***      ***      ***      ***      ***      ***
Minimum and maximum values for left column of table : 84.18 84.44
Partial Table of Tangents
  0      1      2      3      4      5      6      7      8      9
84.2 | 9.8448 9.8619 9.8791 9.8964 9.9137 9.9310 9.9484 9.9659 9.9834 10.001
84.3 | 10.019 10.036 10.054 10.072 10.090 10.108 10.126 10.144 10.162 10.181
84.4 | 10.199 10.217 10.236 10.254 10.273 10.291 10.310 10.329 10.348 10.366

***      ***      ***      ***      ***      ***      ***      ***      ***      ***      ***
Minimum and maximum values for left column of table : 89.44 89.48
Partial Table of Tangents
  0      1      2      3      4      5      6      7      8      9
89.4 | 95.489 97.108 98.782 100.52 102.31 104.17 106.10 108.10 110.18 112.34
89.5 | 114.59 116.93 119.36 121.90 124.55 127.32 130.22 133.24 136.42 139.74

***      ***      ***      ***      ***      ***      ***      ***      ***      ***      ***
Minimum and maximum values for left column of table: -99 0
*** Table generation has been halted ***
    
```

Rounding -> for this, round down

27.23

$(\text{int})((x * 10) + 0.5) / 10.0 = 27.2$

↑
causes to
round up or down

to debug:
• int Max & Min
• 5 sig. digits

use integers for max & min!

break #s aren't accurate

while (max <= min)