

# Fortran 95/2003 Course

Exercises by Robert Barthel  
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STEINBUCH CENTRE FOR COMPUTING - SCC



## Exercise 3.1

- Implement a program that generates a pattern with 8x8 cells. The columns should be labeled by capital letters and the rows by numbers.

```

  A B C D E F G H
+---+---+---+---+
8 | | | | | | | | 8
+---+---+---+---+
7 | | | | | | | | 7
+---+---+---+---+
6 | | | | | | | | 6
+---+---+---+---+
5 | | | | | | | | 5
+---+---+---+---+
4 | | | | | | | | 4
+---+---+---+---+
3 | | | | | | | | 3
+---+---+---+---+
2 | | | | | | | | 2
+---+---+---+---+
1 | | | | | | | | 1
+---+---+---+---+
  A B C D E F G H

```

Hint: The capital letters start at position 65 in the ASCII table (in case you want to use the intrinsic function `ACHAR`, see slide 60)

## Exercise 3.2

- Implement a program that reads measured data from the external file "mdata.txt".
  - Test if the file exists and print out an error message if not.
  - Read in all data sets until the end of the file. Print out the number of data sets and the mean value of each column in a clearly arranged tabular (therefore, sum up the values during the reading process).

```
mdata.txt -12.3425 10.001 0.234521
-11.4253 10.101 0.345212
-12.3457 10.001 0.234517
-12.3523 10.034 0.434621
-12.3210 10.154 0.234521
-12.3497 9.981 0.534421
-12.2227 10.017 0.235412
-12.3521 10.201 0.237722
-12.3398 10.010 0.233529
-12.3501 10.029 0.234521
-12.2799 10.002 0.134521
-12.3429 9.981 0.238528
-12.2227 10.017 0.235412
```

## Exercise 3.3

- Implement a program that prints out the sine, the cosine and the tangent of  $0^\circ$ ,  $45^\circ$ ,  $90^\circ$ , ...,  $360^\circ$  in a tabular as shown below. If the tangent exceeds  $10^6$ , "inf" should be printed out instead of the value.

deg	sin	cos	tan
0	0.0000	1.0000	0.0000
45	...		
90			
135			
180			
225			
270			
315			
360			

Hints: `sin`, `cos`, `tan` expect a value in radians.

$$\pi = 4 * \arctan(1)$$

## Exercise 3.4

- Implement a program that reads  $n$  real numbers (define  $n$  as an integer constant). Store the numbers in an automatic 1D array. Print out the maximum and minimum number and the position of these values during the reading process considering only positive values.

Use the intrinsic functions `maxval/minval` and `maxloc/minloc`, respectively, with their optional parameter `mask`.