Introduction to Fortran: Problem Sheet

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1 Compilation

- Obtain the code examples for this session
  - Download from github: https://github.com/coolernato/Intro-to-Fortran.git
- Find the Compilation directory
- Source.f90 should be compiled as a single file
- Source1.f90 and Source2.f90 should be compiled together
- Compile and run the files by either:
  - Compile it on your own computer and run it
  - Copy and paste it into https://www.onlinegdb.com , select Fortran in the top right and click Run

2 My First Code

- Find the My First Code directory
- Compile and "run my_first_code.f90"
- Experiment with:
  - Changing the words in quotation marks following the print statement
  - Adding more print statements
- You will need to recompile between making a change and running your program

3 Variables

3.1 Order of Operations

- Find the Variables directory
- Compile the order_of_operations file
- Write down what you expect the value of the different cases to be
- Run the file
- Check the results are what you expect

3.2 Arrays

A location in 3d Cartesian space may be represented by (x,y,z) coordinates. This may be represnted by a dimension 1 array with size 3.

- Create a 1d array with three elements to represent Position A, which is at (1,2,1)
- Calculate the location of Position B, which has a displacement of (3,-4,1) from Position A
- Calculate the location of Position C, which is twice as far from the origin as Position B
- Calculate the location of position D, which is found by rotating position C 45^o around the z axis. To rotate an location around the z axis, it may be multiplied by the matrix:

$$\begin{pmatrix} \cos(\theta) & -\sin(\theta) & 0 \\ \sin(\theta) & \cos(\theta) & 0 \\ 0 & 0 & 1 \end{pmatrix} \tag{1}$$