ETH
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Programming Techniques for Scientific Simulations Exercise 2

HS 15
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Problem 2.1 Static & dynamic arrays

1. Write a program allocating an array of length 10 and let the user provide an undetermined number of values (limited to 10) from standard input. Normalise the loaded sequence so that the sum is 1. Print out the normalised sequence in reverse order.

2. Repeat the previous steps using dynamic arrays so that the input size is not longer limited.

The input sequence should be piped from a file `./main < input.txt`

Problem 2.2 Simpson integration library using function pointers

1. Wrap the Simpson integration routine from the previous exercise into a function which takes as arguments a pointer to the integrand, the integration interval and the number of bins. Check the validity/correctness of input parameters using assertions. Put the function into a separate file.

2. Create a header file that declares the function. What are the preconditions and post-conditions? Document this file thoroughly.

3. Write a make file that compiles the function for you. Make sure it only compiles the files that have changed. You may use `make` or `cmake`

4. Compile a library `libintegrate.a` that contains your Simpson integration function. Rewrite your make file to link against it.