

CSCI203 - Week 4 lab exercise 2

Implementing a Heap

This exercise is to be done during your week 4 laboratory class. When you complete the exercise show your work to your lab tutor. You should implement your code in one file (e.g. `ex2.cpp`, `ex2.c`, `ex2.java`, `ex2.py`) with comments for readability.

For this exercise you are to implement a heap, using an array as shown in the lectures. The heap will be built by repeatedly reading the values in the file into sequential locations in the array and then converting the array into a heap using `makeheap()` as seen in lectures.

Once you have built the heap, you are to print out the first five elements of the heap array. Your heap should be able to hold 100 integers. A pseudo-code outline for the program is given below:

```
Begin main display a prompt for the file
    name read in the file name
    try to open the file
    if the file fails to open
        print an error message on the screen and exit
    fi
    while we can read an int from the file
        insert the int into the array
    elihw
    close the file
    makeheap()
    for i = 1 to 5
        print the ith element of the heap
    rof
End main
```

Do not implement the heap using a class or with STL. The heap must be implemented using a fixed size array of integers (100 entries should be enough). The heap array and the index to the last item in the heap should be global variables.

Information on `makeheap` and the functions it uses are available in the lecture notes.