

# Programming – TU856/1 & TU858/1

## Lab 9 – Tuesday, December 6<sup>th</sup>, 2022

**Note:** You are expected to finish all programmes in your own time if you do not get these done during the lab session. This is your own responsibility.

### Pointers and Pointers/Arrays

**Remember:** Use Symbolic names in your programs. Do not hard code.

Write separate programs to:

1. Write a program declaring an integer (*num1*), a character (*char1*) and 2 pointers (*ptr1* that points to an integer and *ptr2* that points to a character).

Initialise *num1* and *char1* to contain an integer and character. Initialise *ptr1* to point to *num1* and initialise *ptr2* to point to *char1*. Your program should do the following:

- a) Print the contents **and** address of *num1* and *char1* (on separate lines).
- b) Print the contents of *ptr1* and *ptr2*. (The output should be the same as the addresses of *num1* and *char1* above).
- c) Using the **dereference operator** (aka **indirection operator**), print the contents of the addresses stored in *ptr1* and *ptr2*.

Do *ptr1* and *ptr2* have address locations? Check and see, i.e., print the address of *ptr1* and *ptr2*.

Try changing the delimiters (i.e., output type) in your printf statements (i.e., %d, %c, %p) and see what happens.

2. Modify your program (Q1) above to do the following:
  - a) Declare a third pointer *ptr3* that points to an integer. Initialise this to point to *char1*. Does this compile? If not, why?
  - b) Using the **dereference operator**, print the contents of the address stored in *ptr3* with %d and %c. Is there a difference? If yes, explain what this difference is (include as a comment in your code).
3. Write a program that uses two float variables called *input1* and *input2*. Enter values for these variables. Using **pointers** (called *ptr1* and *ptr2*), your program should do the following:

- a) Print the address of *input1* and *input2* (on separate lines).
  - b) Print the address of *ptr1* and *ptr2* (on separate lines) - Remember, even though these are pointers, they are still variables. Therefore, each will also have their own address in memory (RAM).
  - c) Make *ptr1* and *ptr2* point to *input1* and *input2* respectively. Print the contents of *ptr1* and *ptr2*. (The output should be the same as the addresses of *input1* and *input1* above).
  - d) Using the **dereference operator**, print the contents of the address stored in *ptr1* and *ptr2*.
4. Write a program that asks the user to enter 2 integer values. Store these in variables called *num1* and *num2* respectively. Using pointers only, find the sum of these numbers, store them in a third variable called *sum*, and display this value stored in variable *sum*. (**Hint**: the dereference operator will be used to perform most of your task). NB - don't forget that you will need 3 pointer variables.
5. Using **pointer notation only**, write a program that uses 2 floating-point arrays with 3 elements in each. Enter values into the 1st array. Copy the contents of this array into the 2nd array. Display the contents of both arrays.