

Indian Institute of Technology Mandi
IC150: Computation for Engineers

Tutorial

Structures, Functions, Pointers

1. Write C statements to declare the following variables, assign a value to them, and dereference them: integer variable, pointer to integer, pointer to pointer to integer.
2. Write using the C syntax, the definition of a structure called *IITMandi-Student* with the following fields: Name, Roll Number, Hostel, Room Number and Mobile Number.
3. Modify the above structure definition to create a user-defined data type called *IITMandi-Student*.
4. What are all the different constituents of a C function definition? Which are mandatory as part of the C syntax and what are optional?
5. Write a C function, *Print-Student-details*, which does not return any value, takes as argument one variable of type *IITMandi-Student*.
6. Write a C function, *Read-Student-details*, which does not return any value, reads one student record from the input by interacting with the user and stores the values in a variable of type *IITMandi-Student*.
7. Define a variable which is a pointer to type *IITMandi-Student*. Use the C library function *malloc* to allocate space for one record of type *IITMandi-Student*, and write a C statement to ensure that the variable points to the allocated space.
8. Assume now that the record in the previous question is now populated with some values. Write the C statement which is a function call to *Print-Student-details* to ensure that the values in the record are printed.
9. Write a C declaration of an array of *IITMandi-Student* with 50 elements. Let the array be called A. What do you understand by the values $A[i]$, $*(A+i)$, and $*A + i$?
10. Write a C function, *Init-Student-Details*, which does the following:
 - a. Ask the user for how many records are required to be processed.
 - b. Allocates space for an array to store that many records, using the C library function *calloc*
 - c. Calls the function *Read-Student-details*, as many times as required to get the records to be processed.