



Department of Electrical and Computer Engineering, NSU
CSE 115L: Fundamentals of Computer Programming
Week 08 (Structures)

Structure: is the collection of variables of different types under a single name for better handling

Declaring Structure Variables Separately	Declaring Structure Variables with Structure Definition	Example of structure definition using typedef
<pre>struct book_data { char title[100]; char author[100]; char topic[100]; int id; }; int main() { struct book_data b; strcpy(b.title, "Title"); strcpy(b.author, "Author"); strcpy(b.topic, "Topic"); b.id = 12; }</pre>	<pre>struct book_data { char title[100]; char author[100]; char topic[100]; int id; }b; int main() { strcpy(b.author, "Author"); strcpy(b.title, "Title"); strcpy(b.topic, "Topic"); b.id = 12; }</pre>	<pre>struct book_data { char title[100]; char author[100]; char topic[100]; int id; }; typedef struct book_data Book; int main() { Book b; strcpy(b.author, "Author"); strcpy(b.title, "Title"); strcpy(b.topic, "Topic"); b.id = 12; }</pre>
Ex- (array of structure)		
<pre>#include<stdio.h> typedef struct person { char name[50]; int id; }student; int main() { int i; student stu[2]; for(i=0; i<2; i++) { printf("Enter student %d name and id:\n",i+1); gets(stu[i].name); scanf("%d",&stu[i].id); fflush(stdin); } }</pre>		<pre>for(i=0; i<2; i++) { printf("Print student %d name and id:\n",i+1); printf("Name: %s\n", stu[i].name); printf("ID: %d\n", stu[i].id); } return 0; }</pre>

Tasks:

1. Create a structure named **Student** with the following components and appropriate data types: *Name, ID, CGPA*
 - i. Create an **Array of Students** of size **three** and take user input to fill the array.
 - ii. Now find the student with the **least** CGPA and display his or hers Name, ID and CGPA.

2. Create a structure named **Player** with the following components and appropriate data types: *Name, Age, Country, Ranking*
 - I. Create an **Array of Players** of size n (user input) and take user input to fill the array.
 - II. Now prompt the user to enter a player's name. Search the whole array and print the corresponding age, country and ranking if the name is found. Print "not found" otherwise.

3. Write a program to add two complex numbers using structure. Create a structure called **Complex** with two components, **real** and **imaginary**. Write a function that takes two structure variables as input, then return the sum of the two complex number.

4. Manhattan distance between two points P(x1,y1) and Q(x2,y2) is defined as follows:
$$M.D. = |x1-x2| + |y1-y2|$$
 - (i) Write down a structure that will model a point in 2-dimensional space. Using the above structure take input of two locations and calculate Manhattan distance between them.