



**भारतीय सूचना प्रौद्योगिकी संस्थान गुवाहाटी**  
**Indian Institute of Information Technology Guwahati**  
**COMPUTER PROGRAMMING LAB (CS110)**  
**ASSIGNMENTS-10**

1. Write a macro to test whether a character is a small case letter or not.
2. Write a macro to find the larger number of two numbers.
3. Create a structure student in C to store the following information about a student:
  - i. name, a string (an array) of 11 characters.
  - ii. roll, an integer.
  - iii. sex, a character, 'M' (male), 'F' (female), 'T' (third gender/ other).
  - iv. gpa, i.e., grade point average, a real (double) value.

Now, perform the following:

- i. Write a function to print an variable of the structure. You need to pass an variable of student to the function. You need to use the "." operator to access the member variables.
- ii. Create an variable of student. Print the address of the variable . Now, print the address of each of its member variables. Print the size of the structure using the sizeof () operator.
- iii. Use the preprocessor directive  
`#pragma pack(1)`  
before defining the structure. Create an variable of student. Print the address of the variable . Now, print the address of each of its member variables. Print the size of the structure using the sizeof () operator.
- iv. Create an array of five student taking user inputs. Print the details of each student. Print the address of each of the five array elements.
- v. Write a function to print an variable of the structure. You need to pass the pointer of an variable of student to the function. You need to use the "->" operator to access the member variables.

4. Define a structure *point* with two integer members *x* and *y* representing *x* and *y*-coordinates. Write a function that accepts two points as parameter and returns the distance.
5. Write a function to swap two structure variables.
6. Realize the following program:

```
#include <stdio.h>
typedef struct node_t {
    int data;
    struct node_t *next;
} Node_t, *Node;
void f(Node_t *h) {
    h ? printf("%d -> ", h->data), f(h->next) : printf("NULL");
}
void g(Node_t *h) {
    h ? g(h->next), printf(" <- %d", h->data) : printf("NULL");
}
int main() {
    Node_t n4 = {4, 0}, n3 = {3, &n4}, n2 = {2, &n3}, n1 = {1, &n2};
    Node h = &n1;
    f(h);
    printf("\n");
    g(h);
    return 0;
}
```

7. Define a union that contains (i) a char variable, (ii) an int variable, (iii) a float variable, and (iv) a double variable. Now, perform following:
  - i. Create an variable of the union. Print the address of each variable.
  - ii. Print the size of the union using the sizeof() operator.
  - iii. Create an variable of the union and initialize it to zero (use "= {0}" during initialization). Assign a value to the char variable and print the other member variables.
  - iv. Create an variable of the union and initialize it to zero (use "= {0}" during initialization). Assign a value to the int variable and print the other member variables.
  - v. Use a pointer to the created variable. Now, access the elements using the "->" operator.
8. Define a structure *S* that has two member variables: (i) a member of type *int* and (ii) a member that of a nested-structure, *P*. *P* has two member variables: (i) a member variable of type *char*, and (ii) a member variable of a nested-union *U*. *U* has a member

of type char and a member of type float. Create an variable of this structure. Scan each of these member variables from the keyboard. Print each of these member variables.