# CMPE-231 DATA STRUCTURES(2010 Spring)
# ••• Laboratory Work  #1

## Duration – 100 minutes
*This laboratory work (Tutorial) covers introduction to Microsoft Visual C++ 6 IDE , Memory representation and array implementations  which is used in all following laboratory experiments.*

**This week two experiments will be done. (only 1.2 ,1.3 and experiment 2 will be done by the student during lab hour)**

## Experiment 1– Writing programs(prepared by the Assistant in the lab and will be explained in details)

**One dimensional array application**
(Examine the program on page 27(Text book Y.Langsam)).
Write a separate C function for each of the following sub problems.

**1.1)**Using randomly selected integer numbers(max value will be 100), you will find their average, and
- List the average
- Determine and list the numbers which are greater than the average.
- Determine  and list frequencies(occurrences) of each number(How many times each number is repeated).

**Example program :**
Following portion of program generates integer numbers(maximum number) in between 1 and 100 using random number generator function rand().

```
#include <stdio.h>
#include <stdlib.h>
void main()
{
        int number;
        do
        {
        number = rand()%100+1;
        printf("%d \n",number);
        }while(number !=100 );
}
```

**1.2)List the output of the following C programs and discuss the output.**
**a)**
```
main()
{
char *p="ABCDEFGH";
printf("%c\n ", *(p+*p-'C'+5));
}
```

**b)**
```
main()
{
int  *p;
int a[4]={3 , 5 , 7 , 12};
for(p=a+3 ; p>=a ; p--)
printf("%d  ", *p);
}
```

**c)**
```
int fun(char *p, char ch)
 {
  int k;
  for(k = 0; p[k] != '\0'; k++)
   if(p[k] == ch) { p[k] = '\0'; break; }
  return k;
 }

 main()
 {
  char a[] = "THEORY=RELATIVITY";
  char *p;
  int i;
  i = fun(a, 'Y');
  printf("%s\n", a);
  p = a + i + 4;
  printf("%s\n", p);
  fun(p, 'V');
  a[2] = 'X';
  printf("%s\n", a);
  (*(p+1))++;
  printf("%s\n", p);
  p[2] = p[1] - 'D' + 'd';
  printf("%s\n", p);
 }
```

**1.3**)Read 3 lines of string of information from the monitor using gets() function, and
After concatenating these string information,
Find and list occurrences of each alphabet in the string.
List the output as follows.

| <u>Alphabet</u> | <u>Occurrences</u> |
|---|---|
| A | 15 |
| B | 3 |
| C | 0 |
| D | 5 |
| .. | |
| Z | 8 |

# Experiment 2– Writing programs(Will be written by the student during lab hour)

Read and concatenate  4 lines of input string and
List occurrences of  each vowel character in the string.

Output will be as follows.

| <u>Vowel Character</u> | <u>Occurrences</u> |
|---|---|
| a | 33 |
| e | 12 |
| i | 5 |
| o | 11 |
| u | 7 |