MA 511: Computer Programming

Lecture 4:

http://www.iitg.ernet.in/psm/indexing_ma511/y10/index.html

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Library Functions

math.h : ceil(d), floor(d), sin(d), cos(d), tan(d), sqrt(d), cosh(d), exp(d), fabs(d), log(d), pow(d1,d2),…

stdlib.h : rand(), srand(u), abs(i), tolower(c), toupper(c),…..

stdio.h : printf(), scanf(), getchar(), putchar(),..

string.h : strcpy(s1, s2), strcmp(s1,s2), strlen(s1)…

Random number generator

```
int seed, s;
double r;
seed = 10000;     // choose a seed value
srand(seed);      //initialize random number generator
s=rand();         // random integer
r=((double)rand() / ((double)(RAND_MAX)+(double)(1)));
                  // random number in [0, 1)
```

Where RAND_MAX may be the largest positive integer the architecture can represent.

Assignments

1. Write a c-code for generating *n* arbitrary (random) points in a square of size *n*, then identity and report which of them are placed
   i) inside ii) outside and iii) on a given circle (center and radius are given as input parameters).
2. over the above given points calculate distance between all pair of points and report the maximum and minimum distances.

Input & Output

- Following functions permits the transfer of information between computer and standard input and output.
  - getchar, putchar, scanf, printf

- **getchat & putchar**

Example: single character

```
char c;
printf("Enter any char value: ");
c = getchar();
printf("the corresponding uppercase char : ");
putchar(toupper(c));
```

scanf: String reading

- char text[80];
- scanf(“ %[^\n]”, text**);**

```
/* writr a c program to find the length of the string using strlen() function */
#include<stdio.h>
#include<string.h>
 main(){
        char name[100];
        int length;
        printf("Enter the string");
        scanf("%s", name);
         length=strlen(name);
        printf("\nNumber of characters in the string is=%d\n",length);
}
```

- scanf statement has a draw back it just terminates the statement as soon as it finds a blank space, suppose if we type the string New York then only the string new will be read and since there is a blank space after word “New” it will terminate the string.

scanf: String reading

- char text[80];
- scanf(“ %[^\n]”, text**);**

/* writr a c program to find the length of the string using strlen() function */

```
#include<stdio.h>
#include<string.h>

main(){
	char name[100];
	int length;

	printf("Enter the string");
	scanf("%[^\n]", name);
	 length=strlen(name);
	printf("\nNumber of characters in the string is=%d\n",length);
}
```

scanf

scanf(“%3d %3d %3d”, &a, &b, &c)

Input: 1 2 3

Output 1 2 3

Input 123 234 456

Output 123 234 456

Input 123234345

Output 123 234 345

Input 1234 2345 5

Output 123 4 234

~~scanf(“%3d, %3d, %3d”, &a, &b, &c)~~

scanf

- float f
- short ix, iy;
- long lx, ly;
- double dx, dy;
- scanf(“%4f %hd %ld %lf ”, &f, &ix, &lx, &dx);
- scanf(“%3ho %7lx %15le”, &iy, &ly, &dy);

o: octal x: hexadecimal e: double-precision

h: short l: long

Strings manipulation ?

- We cannot manipulate strings since *C does not provide any operators* for string. For instance we cannot assign one string to another directly.

  String=“xyz”;
  string1=string2;
- Are not valid.
- To copy the chars in one string to another string we may do so on a character to character basis.
- char a = ‘x’, b = ‘3’, c = ‘#’, text[18] = “guwahati”;
- Are valid

String operations (string.h)

- Length (number of characters in the string).
  - length=strlen(name);
- Concatentation (adding two are more strings)
  - strcpy(string1,”sri”);
    strcpy(string2,”Bhagavan”);
    Printf(“%s”,strcat(string1,string2);
- Comparing two strings.
  - strcmp(string1,string2)
- Copy(copies one string over another)
- Exercise: Substring (Extract substring from a given string)

Example

<u>Read a string than replace each character with an equivalent encoded character</u>

```
char line[80];
int i;
printf("Type a line of text\n");
scanf("%[^\n]", line);
for(i=0; line[i] != '\o'; ++i){
    if(((line[i]>='0') && (line[i]<'9')) || ((line[i]>='A') && (line[i]<'Z')) || ((line[i]>='a') && (line[i]<'z')))
        putchar(line[i]+1);
    else if (line[i] == '9')
        putchar('0');
    else if (line[i] == 'Z')
        putchar('A');
    else if (line[i] == 'z')
        putchar('a');
    else
        putchar('.');
}
```

Input: IIT Guwahati, 781039, Assam, India.

Output: JJU.Hvxbibuj..892140..Bttbn….Joejb.

ASCII

Character	ASCII value
0	48
9	57
A	65
Z	90
a	97
z	122

Assignments

1. Read a string of alphabets (a to z or A to Z) than replace each character with an equivalent encoded character as follows.
2. A or a – 1
3. B or b – 2

26. Z or z- 26

Assignment

Solve the following algebraic Equation:

$X^5+3x^2-10=0$