

Indian Statistical Institute
Computer Science I (Programming in C)
13 September 2013

Maximum time: Three hours

Answer ALL questions. Total Marks: 40

Note 1. Please write neatly and legibly for a code or a piece of a code to be readable.

Note 2. Unless specified otherwise, the only header file you can use is `stdio.h`.

Note 3. Please provide adequate comments in the program that you write

Note 4. For full credit your program must compile and run and give desired result

Question 1: [Marks 2]

The following function is supposed to compute the sum of 1 to n, where n is an integer.

```
int sum(int n) {
int x=0;
x= (1/2)*n*(n+1);
return x;
}
```

The function does not give the correct answer. What answer does it give? Modify the above code to get the intended result.

Question 2: [Marks 7]

What will be the output of the following program?

```
#include<stdio.h>
main() {
char msg[]="ABCDE";
char *p=msg;
printf("%c\n\n", *p++);
printf("%c\n\n", *p);
printf("%c\n\n", *++p);
printf("%c\n\n", *(msg+3));
printf("%c\n\n", ++*(p+2));
printf("msg points to %c\n\n", *msg);
printf("p now points to %c\n", *p);
}
```

QUESTION 3:[Marks 7]

Consider the following copy output program

```
#include <stdio.h>
/* copy input to output; 1st version */
main()
{
int c;
c = getchar();
while (c != EOF) {
putchar(c);
c = getchar();
}
}
```

Modify the following program to ensure that every line in the output contains no more than ten characters. (e.g..

THE INPUT

1234567890abc	1234567890
ABCDE123456 789	abc
	ABCDE12345
	6 789

PRODUCES THE OUPUT

QUESTION 4:[Marks 8]

Write a C function `void splitstr(char *s, char *t1, char *t2, int s_length)` which splits a string `s` of length `s_length` into strings `t1` and `t2` of lengths `s_length/2` (integer div) and `s-s_length/2` respectively. For example the string "abcde" will be split into strings "ab" and "cde". You may assume that the arrays containing `t1`, `t2` have sufficient length.

QUESTION 5: [Total Marks 3+3]

a) Write a C program that provides the following output:

```
X
X X
X X X
X X X X
X X X X X
```

b) Write a C program that provides the following output

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

QUESTION 6 [Total Marks 5+5]

a.) Write a C function `b_coeff (int n)` that prints out the Binomial Coefficients for a given integer in one line with appropriate spacing between the coefficients . For example: `b_coeff(3)` prints out `1 3 3 1` [You can use the factorial function `int factorial(int n)`]

b.) Write a complete C program that will print out the following output:

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
```

Suggestion: a.) Use a loop to print out each line b.) Use a function to insert the number of blank spaces c) Use this function to to control shift of the numbers at each layer. **FULL CREDIT WILL NOT BE GIVEN FOR A HARD CODED ANSWER**