Roll Number:_____

*Thapar University, Patiala*

Department of Computer Science & Engineering

**END SEMESTER EXAMINATION**

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| B. E. (First Year): Semester-I (2017) | Course Code: UTA007 |
| (All branches) | Course Name: Computer Programming-I |
| December 4, 2017 | Time: 2pm |
| Time: 3 Hours, M. Marks: 100 | |

***Note:*** ***Attempt all questions, Assume missing data, if any, suitably. Mention your Group name***

**Q.1** **a)** User Alexa wrote following "C" program:

```
#include<stdio.h>
int main()
{ int fact,num,i;
printf("Enter Number\n");
scanf("%d",num);
for(i=1;i<=num;i++)
fact=fact*num;
printf("%i! = %d\n",num,fact);
return 0; }
```

**i)** She wishes to run the program by just typing name of the binary file but she is getting an error when she does so.

For example:

```
$gcc fact.c -o fact.o
$fact.o      $fact.o: command not found
```

Help her to achieve this by giving the temporary as well as permanent solution.

**ii)** Study the above given program carefully and indicate syntax and/or logical errors (if any).

**iii)** Study the following directory listing:

```
-rwxr--r-- 1 singh singh 7300 Oct  17 15:35 fact.o
-r--r--r-- 1 singh singh  7383  Oct  17 15:40 matrix.o
```

When Alexa tries to run matrix.o, she is getting following prompt. What could be the reason? Give a solution to solve this problem

```
$ ./matrix.o
./matrix.o: Permission denied
```

**(6, 2, 4)**

**b)** Define storage classes defined in C with the help of suitable examples. **(4)**

**Q.2** **a)** Write a program that will take a path description from the user in terms of units (single digit) and direction ('N', 'S', 'E', W') and output the final destination. Use Cartesian coordinate system and start at (0,0). For example, for the path "2E4S1W" the output is (1,-4). Allow up to 10 steps in the path.

**b)** What is the difference between "stdio.h" and <stdio.h>?

**c)** In functions, what is call by value and call by reference? Explain with the help of suitable code examples. **(10, 2, 8)**

**Q.3** **a)** Given an array char *A[9][9][9], starting address is 2000. What will be the address of element at A[4][3][2]?

**b)** Write a program to enter a string of length N and print the number of words in the entered string.

**c)** What is the output of this C code?

```
#include <stdio.h>
void foo(int *p) {
int j = 2;
p = &j;
printf("%d ", *p); }
```

**PTO**

```
int main()
{ int i = 97, *p = &i;
foo(&i);
printf("%d ", *p); }
```

**(4, 6, 6)**

**Q.4** **a)** What is meant by Recursion? Write a program in C, using recursion, to calculate the factorial of an integer entered at the keyboard.

**b)** The following code snippet is supposed to iterate through the given arrays and print values. Fill in the code required to accomplish this task:

```
int ages[] = { 23, 23, 15, 10};
char *names[] = { "Ram", "Singh", "Mary", "Abdulla" };
int count= _____; int *cur_age = _____; char _____ = names;
for (i = 0; i < count; i++) {
printf("%s is %d years old.\n", *(cur_name + i), *(cur_age + i)); }
for (cur_name = ____, cur_age = _____; (cur_age - ___) < count;
cur_name++, cur_age++)
{ printf("%s lived %d years so far.\n", *cur_name, *cur_age); }
```

**c)** In the code snippet given above; showcase how to take input for the ages followed by the names array from "stdin"; instead of initializing it within the program. **(10, 6, 4)**

**Q.5** **a)** What do you understand by command-line arguments? Given the following code (file.c) and run command $./file.c 2 3 +

What would be the result?

```
#include <stdio.h>
int main(int argc, char *argv[])
{ int i = 0;
for (i = 0; i < argc; i++) {
printf("arg %d: %s\n", i, argv[i]); } }
```

**b)** Why do we use debugger? How are debug symbols included in an output file? While using 'gdb' as debugger: what does the following commands achieve: list, next, step, breakpoint, backtrace, print.

**c)** What is a structure (struct) in C? Within this context explain use of '.' operator and '->' operator, also explain use of typedef with help of suitable example. **(4, 6, 10)**

**Q6.** **a)** What is meant by ***stack*** data structure? Showcase declaration of ***stack*** entity as ***an array*** **or as a structure** and give code to implement following functions

i) push
ii) pop

**b)** A link-list node is created as:

```
struct node {
int data;
struct node *next; }*start;
```

Fill the following code snippet and give diagrammatical representation of 3 nodes.

```
void display(_____)
  { temp=head;
  if(temp==NULL)
  {  return; }
  while(temp!=_____)
  {
  printf("%d ",temp_____);
  temp=_____; }
  printf("\n"); }
```

**(4, 4)**