BITS PILANI, DUBAI CAMPUS
Dubai International Academic City, Dubai
First Semester 2011-12
Comprehensive Examination (Closed Book)

No. of Questions: 15
No. of Pages : 4

Course Number & Title : TA C252 – Computer Programming – II **Weightage : 40%**
Duration:3hrs. Date:04-01-2012 Time:12.30p.m.–3.30p.m. Year: II year
Marks : 120

Note : Answer PART- A, PART-B and PART-C in separate answer booklets
Answer all questions sequentially

PART - A

1. A list of train names, their corresponding source and destination stations are stored in a file named **"train.dat".** Write a program which reads any source station namely, **source_input** from the user and prints the following :- 18 Marks
   a) The details of all outgoing trains from **source_input** (their name and destination station)
   b) The total number of outgoing trains from **source_input**

Sample "train.dat"

APExpress	Hyderabad	NewDelhi
Rajdhani	NewDelhi	Ahmedabad
AjmerExp1	Mysore	Ajmer
AjmerExp2	Dadar	Ajmer
AlleppeyExp1	Kannur	Alleppey
AlleppeyExp2	Chennai	Alleppey
AmritsarExp	Dadar	Dhule
ChalukyaExp	Dadar	Yesvantpur

Sample output

If **source_input** = Dadar
AjmerExp2 Ajmer
AmritsarExp Dhule
ChalukyaExp Yesvantpur

Total No. of trains from Dadar = 3

2. Write a single program statement in C to write an array of 10 integers into a binary file. [**Note** : Assume the array name is **marks** and the file pointer is **bp**] 3.5 Marks

3. Write the output of the following code segment 3.5 Marks

```
int main( )
 {
      int i;
      for(i=0; i<4; i++)
      {
           static int a = 20;
           printf("%d", a++);
```

```
        }
        return (0);
    }
```

4. Write the output of the command line program, which is compiled and executed as follows 10 Marks

```
$ cc print_args.c
   $ a.out 10 20

 /* program: print_args.c
    compiled as: cc print_args.c
    excuted as: a.out 10 20
 */
#include <stdio.h>

 main(int argc, char *argv[])
 {
   int i, n1, n2, n3;
   printf("argc=%d\n", argc);
   for (i=0; i < argc; i++)
      printf("%s\n", argv[i]);
   n1 = atoi(argv[1]);
   n2 = atoi(argv[2]);
   n3 = n1 + n2;
   printf ("%d\n", n3);
 }
```

5. Write a 'C' function for sorting an integer array data[] of n elements in ascending order using exchange sort (bubble sort). Use the following prototype (declaration) 12 Marks

```
void sort(int data[], int nelements );
```

PART – B

1. Write functions for the following
   a. To create a linked list by adding nodes to the end of the linked list. Assume the linked list contains float data.
   b. To count the number of nodes in the created linked list. 6 X 2 = 12 Marks

2. A linked list is created to store data in ascending order. The floating point data to be stored are 5.6, 7.5, 9.1,1.2 and 3.5. Diagrammatically show how this linked list is represented as a
   a. Circular linked list b. Double linked list
   Clearly represent the head of the linked list and all the pointers. 3 X 2 = 6 Marks

3. a. Give the pseudo code for performing binary search. 4 Marks

b. Give the time complexity of the binary search algorithm 2 Marks

4. a) Construct a binary search tree and find the inorder, preorder and postorder traversals of the tree. 9 Marks

300, 210, 400, 150, 220, 370, 450, 100, 175, 215, 250, 325, 390, 425, 470

b) Find the depth of the tree constructed. 1 Mark

c) What is the level of node 370? 1 Mark

d) Find the total number of leaf nodes in the tree. 1 Mark

5. a) Convert infix expression to postfix form. 3 Marks

a+b*c-d/e*f

b) Evaluate the expression 1 2 3 * + 4 - in tabular form showing stack after every step. 5Marks

6. What does the following code fragment do to the queue q? 4 Marks

```
void que (int queue[], int front, char val, int &rear)
{
if ((rear + 1) % MAX == front)
{
        printf("Queue");
}
else
{
        rear = (rear + 1) % MAX;
        queue[rear] = val;
}
}
```

PART – C

1. Write the output of the following code. 5 Marks

```
#include<stdio.h>
main()
 {
int m[2];
int *p=m;
m[0]=100;
m[1]=200;
printf("%d %d",++*p,*p);
}
```

2. Write the output of the following code. 5 Marks

```
#include<stdio.h>
 main()
 {
int m=300;
 int *p1=&m;
 int **p2= &p1;
 printf("%d ",**p2);
 }
```

3. Write the output of the following code. 5 Marks

```
#include<stdio.h>
 void fun(int *x, int y);
 main()
 {
 int i=4,j=2;
 fun(&i,j);
 printf("%d %d\n",i,j);
 return 0;
 }
 void fun(int *i,int j)
 {
 *i=*i * *i;
j=j*j;
 }
```

4. Write a recursive function to obtain the sum of first 25 natural numbers. 10 marks

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BITS PILANI, DUBAI CAMPUS
Dubai International Academic City, Dubai
First Semester 2011-12
Test – 2(Open Book)

No. of Questions: 6
No. of Pages : 2

Course Number & Title : TA C252 – Computer Programming – II **Weightage : 20%**
Duration : 50 minutes **Date:13-11-2011** **Year : II year** **Marks : 60**

Note : Answer All Questions Sequentially

1. A list of id-numbers and corresponding total mark of each student in a class are stored in a file named **"input.dat".** Write a program to find and print the id-number(s) of student(s) who has(have) scored the highest mark in the class.
   [Note: If multiple students are toppers, program should print the id-numbers of all of such students]

Sample "input.dat"		**Sample output**	
2010A3PS015U	45	2010A4PS045U	60
2010A4PS045U	60	2010A7PS065U	60
2010A7PS035U	50		
2010A4PS055U	30		
2010A7PS065U	60		

(15 Marks)

2. Write a program which reads an expression having three values and two arithmetic operators (+, -, X, /) from the command line. The program should evaluate the expression in the same order of occurrences of the operators, **without considering the operator precedence** and print the result.
   Sample Input: $ program 10 x 5 / 2
   Output: 25 (15 Marks)

3. Find the output of the program given below. (5 Marks)

```
#include <stdio.h>
static int i=10;
int main()
{
  i=5;
  for(i=0; i<5; i++)
  {
      static int a=10;
      printf("%d", a++);
  }
 return 0;
}
```

4. Point out the error in the following program and explain the reason. (5 Marks)

```
#include <stdio.h>
int main()
{
    extern int i=10;
     printf("%d", i);
     return 0;
}
```

5. A. Give the output of each of the following printf statements. (6 Marks)

```
#include <stdio.h>
#define EXPRESSION1     1 + 2 + 3 + 4
#define EXPRESSION2     EXPRESSION1 + 10
#define ABS(x)          (((x) < 0) ? -(x) : (x))
#define MAX(a,b)        ((a < b) ?  (b) : (a))
#define BIGGEST(a,b,c)  ((MAX(a,b) < c) ?  (c) : (MAX(a,b)))

int main ()
{
  printf ("%d\n", EXPRESSION1);
 printf ("%d\n", EXPRESSION2);
 printf ("%d\n", ABS(-5));
 printf ("Biggest of 20, 22, and 21 is %d\n", BIGGEST(20,22,21));
 return 0;
}
```

B. Give conditional Macro definitions for the following conditions where the foreground color is dependent on the background color. Foreground will represent 0 if the Background represents 7, Foreground will represent 1 if Background represents 6. Otherwise Foreground will represent 6.Any initial values of foreground and background must be overwritten. (4 Marks)

6. A positive integer is entered through the keyboard, write a program which uses a recursive function to print the digits of the number in reverse order. (10 marks)

********** **BEST OF LUCK**********

BITS PILANI, DUBAI CAMPUS
Dubai International Academic City, Dubai
First Semester 2011-12

No. of Questions: 5
No. of Pages : 3

Test – 1(Closed Book)

Course Number & Title : TA C252 – Computer Programming – II **Weightage : 25%**

Duration : 50 minutes **Date:25-9-2011** **Year : II year** **Marks : 75**

Note : Answer All Questions Sequentially

1. a) Identify the errors (if any) in the following code C statements/code snippets.

i)
```
int array[] = { 0, 10000 } ;
```

ii)
```
main()
{
int x[10] = { 1,2, 3}; int y[] = {1,2,3};
y[4] = x[2];
}
```

iii)
```
double b[5] = -2;
```

iv)
```
char s[] = 'C';
```

v)
```
void func ( int mat[][], int r, int c);
```

(5 * 2 = 10 Marks)

b) Find the output of the following program. (5 Marks)

```
void rotate (int inp_arr[], int n, int out_arr[] )
{
 int i;
for (i = 0; i <= n-2; i++ )
        out_arr[i+1] = inp_arr[i];
   out_arr[0] = inp_arr[n-1];
}
main()
 {
int x[10] = { 10, 3, -2, 4, 5 }, y[10];
int n = 5, i;
rotate ( x, n, y);
for(i=0; i<n;i++)
        printf ("%d ", y[i]);

}
```

2. a) A structure contains details of members of a family, the details stored in the structure include Status, Name, age. Use an array of structures to store details of 20 members of the family and display the details of the eldest and youngest members of the family. e.g. The details for a member can be Uncle, Raja, 45. Assume the age of all members is unique. (9 Marks)

   b) Given the following declaration

```
typedef struct account
{
int no;
char name[40];
char type[40];
} A;
```

   State whether the following declarations are valid or invalid. Also, correct the invalid declarations.

   i) struct account x1;
   ii) struct account x1[20];
   iii) A x1;
   iv) A x1[40]; (6 Marks)

3. a) Using nested structures write a program to have a structure called employee containing string field for name and structure field for address. The address should contain integer for phone, string for city and integer for pin. The program should give the following output.

   Name= ABCD phone=2344521 city=Dubai pin=234 (5 Marks)

   b) Write a program that compares two given dates. To store a date use a structure that contains three members namely day, month and year. If the dates are equal then display "Equal" otherwise "Unequal. (10 Marks)

4. It is required to store the details of 'n' number of students in a class namely idno, name and total marks. Write a program using suitable declarations for the same and read the details of 50 students. The program should also find the class topper using a function called **topper(.....)** which uses all students details to find the topper. The function should return the details of the topper to the main program. The final output should be from main(). (15 Marks)

5. a) Describe the output generated by the following program. Distinguish between meaningful and meaningless output. (6 marks)

```
#include<stdio.h>
main()
{
union
{
        int i;
        float f;
        double d;
  } u;

  u.i = 100;
  printf ("%d %f %f\n", u.i, u.f, u.d);
  u.f = 0.5;
  printf ("%d %f %f\n", u.i, u.f, u.d);
  u.i = 0.0166667;
  printf ("%d %f %f\n", u.i, u.f, u.d);
}
```

b) What will be the output of the program? (4 marks)

```
#include<stdio.h>
int main()
{
 enum days { MON = -1, TUE, WED = 6, THU, FRI, SAT};

 printf("%d %d %d %d %d %d\n", MON, TUE, WED, THU, FRI, SAT);

 return 0;
}
```

c) Suppose a and b are unsigned integer variables whose values are 0x6DB7 and 0xA726, respectively. Find

i. a &b (bitwise AND)
ii. a|b (bitwise OR)

(5 Marks))

********** **BEST OF LUCK**********

BITS PILANI, DUBAI CAMPUS
Dubai International Academic City, Dubai
First Semester 2011-12

No. of Questions: 11	
No. of Pages	: 3
VERSION	**: A**

Quiz 1(Closed Book)

Course Number & Title : TA C252 – Computer Programming – II **Weightage : 8%**
Duration : 20 minutes **Date:11.10.2011** **Year : II year** **Marks : 24**

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1. State whether the following are **TRUE or FALSE**
   a. When initializing a string variable to a string constant, we should include the null character as part of the string constant.
   Ans : _____

   b. The function call strcmp("abc", "ABC") returns a positive number.
   Ans: _____ (1x 2= 2 Marks)

2. What is the value of **t1** after executing these statements, if the value of **t2** is **"Merry Christmas".**

```
strncpy(t1, &t2[3], 5);
t1[5] = '\0';
```

Ans: _____ (1 Mark)

3. Complete the **if** test condition which can be used to compare two strings **s1** and **s2**

```
main()
{
   char *s1 = "hello";
   char s2[10] = "hello";
   if ( _____ )      printf ("strings are equal\n");
        else  printf ("strings are not equal\n");
}
```

(1 Mark)

4. Given the following declaration, **char *s1 = "computer programming"; char s2[20];** write a pair of C statements using suitable function call to assign substring **"program"** of **s1** to **s2.**

Ans:_____ (1 Mark)

5. Given the following declaration, **char s1[100] = "computer ", s2[100] ="programming ", char s3[100] = "course"** write a single C statement using suitable function call to concatenate **s1**, **s2** and **s3** in that order and store the resulting string in **s1.**

Ans: _____ (2 Marks)

6. Write the output of the following code assuming array begins at 65486.

```
# include<stdio.h>
main()
{
    int arr[]={10,20,30,40,50};
    printf("%u\n%u\n", arr, &arr);
    printf("%u\n%u", arr+1, &arr+1);
}
```

Ans: _____ (4 Marks)

7. Give the output in the specified line

```
#include<stdio.h>
 main()
{
   int x=5,y=10,a;
   int *p1, *p2;
  float sum=0.0;
   p1=&x;
   p2=&y;
   a=*p1 * *p2;
   sum = sum + *p1;
   *p2 = *p2 + 10;
   printf("a=%d  sum=%f  p2= %d", a, sum, y);
}
```

Ans : _____ (3 Marks)

8. Give the output in the specified line

```
#include<stdio.h>
#include<string.h>
 main()
{
     int n;
    char a[]="MalayalaM";
    char  *t,*s,*b;
     s=a;
     b=a+n-1;
     t=b;
    while(s < b) {
       printf("%c",*s);
      s++;
      printf("%c",*b);
      b--;
   }
}
```

Ans : _____ (3 Marks)

9. Write the output of the following code assuming array begins at 4002.

```
# include<stdio.h>
main()
{
    int a[3][3]={1,2,3,4,5,6,7,8,9};
    printf("%u\n%u\n%u", a[0]+1, *(a[0]+1), *(*(a+0)+1));
}
```

Ans : _____ (3 Marks)

10. Point out the error in the following program.

```
#include<stdio.h>
#include<stdlib.h>
 int main()
{
    int *a[3];
    a = (int*) malloc(sizeof(int)*3);
    free(a);
    return 0;
}
```

A. Error: unable to allocate memory
B. Error: We cannot store address of allocated memory in variable **a**
C. Error: unable to free memory
D. No error

Ans: _____ (2 Marks)

11. What will be the output of the program?

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
    int *p;
    p = (int *)malloc(20); /* Assume p has address of 1314 */
    free(p);
    printf("%u", p);
    return 0;
}
```

A. 1314
B. Garbage value
C. 1316
D. Random address

Ans: _____ (2 Marks)

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BITS PILANI, DUBAI CAMPUS
Dubai International Academic City, Dubai
First Semester 2011-12

No. of Questions:	8
No. of Pages	: 3
VERSION	: A

Quiz 1(Closed Book)

NAME: MARKING SCHEME **ID NO:** _____

Course Number & Title : TA C252 – Computer Programming – II **Weightage : 5%**
Duration : 20 minutes **Date:27.10.2011** **Year : II year** **Marks : 15**

1.Given the following declarations

char s1[50] = "computer", s2[50] = "programming";

write a c statement to store the string "computerprogram" in s1, from s1 an s2 2M

Ans: strncat (s1+8, s2, 7);

2. What is the output of the following code?

```
char s1[] = "Jabalpur";
char s2[] = "Jaipur";
printf ("%d\n", strncmp(s1, s2, 2));
```

2M

Ans: 0

3. Write the output of the following code snippets 2M

```
char string[] = "CProgram";
int p, q;
for(p = 0; p<=7; p++)
{
  for(q =0; q<=p; q++)
      printf("%c", string[q]);
  printf("\n");
}
```

Ans:

C
CP
CPr
CPro
CProg
CProgr
CProgra

4. Give the output of the following printf statement. 2M

```
main()
{
   int u1,u2;
   int v=3;
   int *pv;
   u1 = 2 * ( v + 5);
   pv = &v;
   u2 = 2 * ( *pv + 5 );
   printf(" u1 = %d   u2 = %d\n", u1, u2);
}
```

Ans: u1 = 16 u2 = 16

5. Tick if the following code snippets is correct or incorrect. 1M

```
int * j;
int **k;
int i = 3;
 j = &i;
k = &j;
```

Ans: **a. Correct** √ b. Incorrect

6 Give the output of the following printf statement. 3M

```
#include<stdio.h>
  main()
 {
     int b[]={10,20,30,40,50};
     int i,*k;
     k=&b[4]- 4;
     for(i=0;i<=4;i++)
     {
        printf("%d ", *k);
        k++;
     }
 }
```

Ans: 10,20,30,40,50

7. *malloc()* returns a *float* pointer if memory is allocated for storing *float*'s and a *double pointer* if memory is allocated for storing *double*'s. State true or false. 1.5M

Ans: **a.True** √ b. False

8. How will you free the memory allocated by the following program? 1.5M

```
#include<stdio.h>
#include<stdlib.h>
#define  MAXROW 3
#define  MAXCOL 4

int main()
{
   int **p, i, j;
   p = (int **) malloc(MAXROW * sizeof(int*));
   return 0;
}
```

Ans:

A.memfree(int p);
B.dealloc(p);
C.malloc(p, 0);
D.**free(p);**

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