मोतीलालनेहरू राष्ट्रीय प्रौद्योगिकीसंस्थानइलाहाबाद
प्रयागराज (इलाहाबाद)–211004 (भारत)

Motilal Nehru National Institute of Technology Allahabad
Prayagraj-211004 [India]

End Semester Examination 2019-20

Programme Name: B.Tech **Semester: I**

Course Code: (CS-11101/1101/1201/12101) **Course Name:Computer Programming**

Branch: Common to All Branches **Student Reg. No.:** 2 0 1 9

Duration: 3 Hours **Max. Marks: 60**

Instructions: Attempt all questions

Q1. Attempt the following:

(a). Explain the mechanism of binary search with recursive C program and calculate its time complexity with suitable justification. Apply the same mechanism on the following data and demonstrate it. {10, 20, 80, 30, 60, 50, 110, 100, 130, 170} with key =30.(4M)

(b). A record contains name of cricketer, his age, and number of test matches that he has played and the average runs that he has scored in each test match. Create an array of structure to hold records of 2000 such cricketer and then write a program to read these records and arrange them in ascending order by average runs. (4M)

(c). Explain the algorithm of insertion sort in C program using function and pointers. Also, analyze its order of comparison for n input elements in best case and worst case. (4M)

Q2. Attempt the following:

(a). Explain dynamic memory allocation, and its advantages. (4M)

(i). Demonstrate by allocating 40 Bytes of memory and reallocate it to 400 Bytes.

(ii). Demonstrate by 10 blocks of memory and each block of size 20 Bytes and afterwards free the blocks of memory.

(b). For the following set of sample data, compute the standard deviation and the mean using C Program.-6, -12, 8, 13, 11, 6, 7, 2, -6, -9, -10, 11, 10, 9, 2. The formula for standard deviation is $\sqrt{(x_i - x')^2/n}$, where x_i is the data item and x' is the mean. (3M)

(c). Explain the concept of opening of a file from disk, and write a program in C for displaying the contents of a file (CSED.c) on the screen. Also extend the same program for counting the number of characters, spaces, and newlines in the same file. (4M)

(d). Explain the following terms: (6M)

(i) typedef and enum

(ii) Pointer Arithmetic in C

(iii) How Structure and Union elements are stored?

(iv) goto statement

Motilal Nehru National Institute of Technology Allahabad
Department of Computer Science & Engineering
B.Tech (Group- D/E/F) Semester I (END Semester Exam)
November 2017

CS 1101: Computer Programming

Time : 180 Minutes

M.Marks: 60

NOTE:

- All sections are compulsory
- Attempt the questions strictly in sequential order.
- Answers should be justified & to the point

SECTION A[6+6+8+8[4+4]=28 Marks]

1. Answer the following questions:
   (a) Differentiate between the functions malloc and calloc with suitable example.
   (b) How global and local variables can be defined in C? Also explain what will happen if there is a name conflict between local and global variable, show with an example.
   (c) What is function pointer explain with suitable example?

2. Answer the following questions:
   (a) In C language, is it possible to return the address of a local variable of a function? If yes then explain with example and if no then justify your answer.
   (b) Describe with examples, the different ways of assigning values to structure members.
   (c) Describe the two ways of passing parameters to functions with example.

3. a) Write a C program to evaluate the series given below upto n term where 'x' is an integer entered from user.
   $\cos(x)=1 - x^2/2! + x^4/4! - x^6/6! + \ldots$
   b) What is the output of the following coce? Justify your answer.

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
int i;
int *ptr = (int *)malloc(5*sizeof(int));
for (i=0,i<5;i++)
 *(ptr +i) =i;
printf("%d", *ptr++);
printf("%d",(*ptr)++);
printf("%d", *ptr);
printf("%d",*++ptr);
printf("%d",++*ptr);
}
```

SECTION B(6*3=18 Marks)

1. Answer the following questions:
   a) Define Structure. What do you mean by Nested Structure?Explain with example.
   b) What is the purpose of realloc()? Explain with example.
   c) What is the advantage and disadvantage of a union over a structure. Explain with example.

2. Answer the following questions:
   a) How does the **fopen()** and **fclose()** works? Explain it with example.
   b) Explain the differences between **calling function** and **calledfunction**?
   c) What is static variable? Compare it with standard local variable.

3. Write a C program in which a function takes an integer parameter(greater than 1) and return the value of the highest power of that integer which is less than 1000.
   [For example, for parameter value 2 your function should return 512 (since 2^9 = 512 < 1000 but 2^10 > 1000). Similarly for parameter values 3 and 1234, your function should return 729 and 1.]

SECTION C (8*4=32 Marks)

1. Write a C program to read 'n' numbers in an array in **main()** and then pass this array in **fun()**as an argument and in '**fun()**'split the array into two arrays even and odd such that the array even contains all the even numbers and other is odd.
   For example:
   Input: ar[]={7,9,4,6,5,3,2,10,18}
   Output: Odd array is 7,9,5,3
   Even array is 4,6,2,10,18

2. Write a C program to perform row-wise summation of integer values matrix and then determine and print the largest value of these row-wise summation values.
   For example:
   Input: ar[][3]={{4,5,6},{3,5,9},{1,2,3}};
   Output: Row-wise summation values:
   15, 17, 6
   Largest summation value=17

3. Write a C program to accept multiple strings and display combination of every two strings by creating separate function.

4. Create a structure to specify on students given below:
   Roll number, Name, Department, Course, Year of joining
   Assume that there are not more than 450 students in the college by using Dynamic Memory Allocation.
   i. Write a function to print names of all who joined in a particular year.
   ii. Write a function to print the data of a student whose roll number is given.

Motilal Nehru National Institute of Technology Allahabad
Department of Computer Science & Engineering
B.Tech (Group- A/B/C/G) II Semester (End Semester Exam)
May 2018

CS 12101: Computer Programming

M.Marks: 60 **Time : 180 Minutes**

NOTE:
- All sections are compulsory
- Attempt the questions strictly in sequential order.
- Answers should be justified & to the point

Assume library (#include<stdio.h>,#include<string.h>, #include<math.h>), and return 0 and main function if missing. Give the outputs of the following program segments assuming 32 bit compiler. Justify your output through explanation.

SECTION A [2.5*4=10 Marks]

What is the output printed by the following segments of C code? Justify your answer, **1 marks is for the correct output and 1.5 marks for Justifications.**

a)
```
#include<stdio.h>
main(){
int m=1,n=2;
for( ; m+n<10; n++)
{
switch(m != n){
case 1: m*=2;
break;
default: m*=1;
}}
printf("m=%d n=%d",m,n);}
```

b)
```
#include <stdio.h>
void aup3(int,int *,int,int *);
int main()
{int a[5]={5,4,3,2,1};
inti,sum = 4;
aup3(a[1],a+2,a[2],&sum);
printf("sum = %d\n",sum);
for(i=0;i<5;i++)
printf("%d ",a[i]);
printf("\n");
return 0;}
void aup3(int a, int *b, int c, int *total)
{int sum;
sum = a+*b+c;
total = &sum;
*(b-1)=10;
*(b+2)=20;
a=14;
c=11;}
```

c)
```
#include <stdio.h>
int f(int x, int *py, int **ppz){
int y, z;
 **ppz += 1;
z = **ppz;
 *py += 2;
  y = *py;
  x += 3;
return x + y + z;}
void main() {
int c, *b, **a;
  c = 4;
  b = &c;
  a = &b;
printf( "%d", f(c,b,a));
printf("\nc=%d",c); }
```

d)
```
#include<stdio.h>
void fun(int);
void fun (int n){
if (n <=1) {
printf ("%d", n);}
else {
fun (n/2);
printf ("%d", n%2);}
}
main(){
        int x=173;
        fun(x); }
```

Motilal Nehru National Institute of Technology Allahabad

Department of Computer Science & Engineering

B.Tech II Semester (End Semester Exam) (A/B/C/G Group)

April 2017

Computer Programming: (CS 1201)

M.Marks: 60 **Time : 180 Minutes**

NOTE:

- All sections are compulsory
- Attempt the questions **strictly** in sequential order.
- Answers should be justified & to the point

SECTION A [4*8=32 Marks]

1. **Using short code snippets illustrate the following**

   a) Pass a 1 d array to a function.

   b) Pass a 2 d array to a function.

   c) Return pointer to 2 d array through function

   d) Pass and return structure to/from a function using call by value and call by reference.

2. **Answers the following questions**

   a) Differentiate between type conversion and type casting with suitable examples.

   b) What does scanf do if it is asked to read a number but the user enters nonnumeric character?

   c) Define static storage class with suitable programming example. Justify your answer using multiple call of same function.

   d) There is no logical exclusive OR operator in C; Can it be simulated anyway?

3. Differentiate between structure & array. Write a C program that, given an array A[] of n numbers and another number **X**, determines whether or not there exist two elements in S whose sum is exactly **X**.

4. Write a C Program to Print Binary Equivalent of an Integer using Recursion.

[P.T.O]

SECTION B: [6+8+8+6 Marks]

1. **Answers the following questions.**

   a. What is the purpose of function prototype?
   b. Differentiate between break and continue.
   c. How can we return multiple values from a function? Explain with an example.

2. Given an array of **n** distinct integers sorted in ascending order, write a function that returns a Fixed Point in the array, if there is any Fixed Point present in array, else returns -1. Fixed Point in an array is an index 'i' such that arr[i] is equal to 'i'. Note that integers in array can be negative.

3. Write a C program which take a pointer to a quadrilateral and display its vertices. A quadrilateral is represented by a pair of pointers each of which points to a diagonal. A diagonal is a represented by a pair of pointers each of which points to a point. A point is represented by a pair of coordinates. Use appropriate structures to represent a point, a diagonal and a quadrilateral. Use a function *makepoint()* which take two coordinates and return a point.

4. Write short notes on following.

   a) **Dynamic memory allocation**
   b) **Bitwise operators**
   c) **Formatted Input/output**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
MOTILAL NEHRU NATIONAL INSTITUTE OF TECHNOLOGY ALLAHABAD
End Semester Exam (Odd Semester) 2015-16
Computer Programming
(Old & New Curriculum)
B.Tech I sem - Section D, E & F

Maximum Marks: 60

Time: 3 hours
Note: Attempt all questions. Write to the point.

1. Discuss Insertion Sort Algorithm in detail. How it is designed, Write its C program. **[2+2+4]**
2. How Structures are declared in C language. Write a C Program to store and print data of 30 students using structure. For each student following data is required: Registration Number, Name, Date of Birth and Age. **[3+6]**
3. What is a Pointer? Write a Program to print the elements of a single dimensional array using two pointers. **[2+5]**
4. What is an Object Oriented Programming? Why it is better than Procedural Oriented Programming? Explain Encapsulation, Data Hiding, Inheritance and Polymorphism. **[2+2+4]**
5. Write a program to convert a binary number to decimal number and vice versa. **[3+3]**
6. Which standard Programming Technique is used in designing Binary Search Algorithm? Explain how this technique works. List all programming technique with their examples. Write the algorithm and program for Binary Search. **[2+2+2+4]**
7. For the given list of 10 numbers **[2+2+4+4]**

   8, 15, 7, 1, 2, 3, 6, 14, 13, 17

   Write the following programs
   a. Find out the average of list.
   b. Insert a new element 21 after element 1 and create new list 8, 15, 7, 1, 21, 2, 3, 6, 14, 13, 17.
   c. Delete 13 from this list and reprint the series 8, 15, 7, 1, 21, 2, 3, 6, 14, 17.
   d. Subtract largest element from each element and print the average of modified list

*******End of Paper*******

```
else {
int s,x;
for(s=0;x>0;s+=x%10,x/=10);
printf("s=%d x=%d n=%d",s,x,n);
}
}
```

```
return 0;
}
```

5. Predict the output of the following program and justify your answer.

```
#include <stdio.h>
void main()
{
  int i = 0;
  while (i < 2)
  {
    if (i == 1)
      break;
      i++;
    if (i == 1)
      continue;
  printf("In while loop\n");
  }
  printf("After loop\n");
}
```

6. Predict the output of the following program and justify your answer.

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

SECTION B: (Do any 5 questions)[1.5*5=7.5 Marks]

1. Write a program to accept any eight digit number and print the sum of all even digits of that number and multiplication of all odd digits using loop
2. Describe the structure of a C program. Write the process of creating and executing a C program under UNIX system. Describe the process of compilation, linking and loading.
3. What is difference between declaring a variable and defining a variable? Why data type is specified for a variable declaration?
4. What is the difference between function declaration and function definitions. explain with example.
5. Describe the mechanism of a function call with suitable example and also discuss the advantages of functions.
6. Differentiate between any two of following.
   a. Compiling and Linking
   b. **break** and **continue** keywords
   c. Storage class in C.

SECTION C: [2.5*3=7.5]

1. Write the recursive function definition in C of Greatest Common Divisor (GCD) of two numbers.
2. Write a program in C to Check Whether a Number can be Express as Sum of Two Prime Numbers.

   Test Data :
   Input a positive integer: 16
   Expected Output :
   16 = 3 + 13
   16 = 5 + 11

   Input a positive integer: 3
   Expected Output:
   3 can not be expressed as sum of two prime numbers.
3. Write a program using switch case to display a menu that offers five options: read three numbers, calculate total, calculate average, display the largest, display the smallest, and display the second largest

Motilal Nehru National Institute of Technology Allahabad

Department of Computer Science & Engineering

B.Tech (Group- A/B/C/G) II Semester (End Semester Exam)

May 2016

CS 1201: Computer Programming

M.Marks: 60 **Time : 180 Minutes**

NOTE:

- All questions (**Total six questions**) are compulsory
- Attempt the questions **strictly** in sequential order
- Answers should be justified & to the point
- Each question carries equal marks

1. Using short code snippets illustrate the following [2.5* 4=10]
   a. Pass a 1 dimensional array to a function.
   b. Pass a 2 dimensional array to a function.
   c. Return pointer to 1 dimensional array through function.
   d. Pass and return structure to a function using call by value and call by reference.

2. Differentiate between structure & array. Define a structure named **Player** that contains following fields: Player name, Team name and Runs. Declare an array of structure variables with 10 elements of type Player and write a program to read the information about all 10 players and print a team-wise list containing names of players with their runs. [10]

3. Answers the following questions. [2.5*4=10]
   a. What is the purpose of function prototype?
   b. Differentiate between break and continue.
   c. How can we return multiple values from a function? Explain with an example.
   d. Write the function definition of strlen() that should return length of a string.

4. Write a function for Matrix Multiplication. Pass two 2-D matrices as arguments to the function. Matrix Multiplication function should return resultant matrix to the calling function. [10]

   OR

   Differentiate between Selection sort and Insertion sort with examples. [10]

5. Answers the following questions. [2.5*4=10]
   a. Is it legal to nest one comment within another? Explain
   b. Write the recursive function definition in C of Greatest Common Divisor (GCD) of two numbers.
   c. What does scanf do if it is asked to read a number but the user enters nonnumeric character?
   d. Define static storage class with suitable programming example. Justify your answer using multiple call of same function.

6. Write a program which take a pointer to a quadrilateral and display its vertices. A quadrilateral is represented by a pair of pointers each of which points to a diagonal. A diagonal is a represented by a pair of pointers each of which points to a point. A point is represented by a pair of coordinates. Use appropriate structures to represent a point, a diagonal and a quadrilateral. Use a function makepoint () which take two coordinates and return a point. [10]

OR

Mr. Yagami is a scientist in the Bhabha Atomic Research Centre. They are conducting a lab experiment on nuclear fission. In nuclear fission, one atom breaks into more than one atom of the same type. Initially, there are N atoms in the lab. Starting from now (t=0), after each second, every atom will break into K atoms of the same type. They don't want the number of atoms to exceed M, so they have to stop the reaction at some time t=T. Can you find this value T for Mr.Yagami? [10]

Input Format:

First line contains P, the number of test cases. Next P lines contain three integers each. These three integers represent the values of N, K and M respectively.

Output Format:

For each test case print the time at which the reaction will have to be stopped.

Constraints:
$1 \leq P \leq 10^4$
$2 \leq N, K, M \leq 10^{18}$

Sample Input:

```
2       // Number of test cases
2 2 7   // the value of N,K,M for test case 1
2 2 8   // the value of N,K,M for test case 2
```

Sample Output:

```
1
2
```

Explanation:

1st Test case:
at t=1, number of atoms=4
at t=2, number of atoms will be 8.
So reaction has to be stopped at t=1.

2nd Test case:
at t=1, number of atoms=4
at t=2, number of atoms will be 8.
at t=3, number of atoms will be 16.

Motilal Nehru National Institute of Technology Allahabad

Department of Computer Science & Engineering

B.Tech (Group- A/B/C/G) II Semester (End Semester Exam)

May 2015

CS 1201: Computer Programming

M.Marks: 60 **Time : 180 Minutes**

NOTE:

- All questions are compulsory
- Attempt the questions **strictly** in sequential order
- Answers should be justified & to the point

SECTION A [5*5=25 marks]

1. Differentiate between **static** and **const** using examples.
2. Explain the following with examples :
   (a) NULL pointer (b) void pointer (c) Character array (d) Character pointer (e) Array of pointers.
3. Differentiate between Structure and Union using an example.
4. Write a short code to create a 2 d array using dynamic memory allocation.
5. Differentiate between Typecasting and type conversion with examples. How is void pointer used in typecasting (Take the scenario of dynamic memory allocation and explain)?

SECTION B [3*5=15 Marks]

Assume library (#include<stdio.h><string.h>, #include<math..h>,), and return 0 and main function if missing. Give the outputs of the following program segments assuming 32 bit compiler. Justify your output through explanation.

1.
```
int main()
{
char s[50],w[20],d[20],t[50];
int i=0,j,b;
printf("enter the sentence \n");
scanf("%[a-z,A-Z, ]",s);
printf("enter the word \n");
scanf("%s",d);
while(s[i]!='\0')
{       j=0;b=0;
        while (1)
        {
            if(s[i]==' '|| s[i]=='\0')
            break;
            w[j++]=s[i++];
        }
        w[j]='\0';
        if(strcmp(w,d)==0)
        {
        strcat(t,w);
        strcat(t," ");
        }
        if(s[i]!='\0')
        i++;
}
 printf("After prog execution the output is\n
printf("%s",t);
}
```

[P.T.O]

2.
```
int main()
{ static char* s[]={ "india",
                     "france",
                     "nepal",
                     "bhutan",
                     "lanka"
                     };
  static char **ptr[]={s+4,s+3,s+2,s+1,s};
    char ***p=ptr;
                printf("%s\n",**++p+1);
                printf("%s\n",*--*++p+2);
                printf("%s\n",*p[-2]+4);
                printf("%s\n",p[-1][-2]+2);
}
```

3.
```
#include<stdio.h>
int main()
{
 struct s1
  {
      char *str;
      int i;
      struct s1* ptr;
};
  static struct s1 a[]= {{"Nagpur",1,a+1},
                         {"raipur",2,a+2},
                         {"Kanpur",3,a}
                        };
                        struct s1 *p=a;
                        int j;
                        for(j=0;j<=2;j++)
                        printf("%d",--a[j].i);
                        printf("%s\n",++a[j].str);
                        }

                        getch();
                        return 0;
}
```

SECTION C [10+10=20 Marks]

1. Using short code snippets illustrate the following :
   a) Pass a 1 d array to a function.
   b) Pass a 2 d array to a function.
   c) Return pointer to 1 d array through function
   d) Return pointer to 2 d array through function
   e) Pass and return structure to a function using call by value and call by reference.

2. An array of size N is given, N is even. In this array one entry is repeated $N/2$ times and the remaining $N/2$ entries are unique. Write a program to find the repeated value.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
MOTILAL NEHRU NATIONAL INSTITUTE OF TECHNOLOGY, ALLAHABAD
End Semester Exam (Odd Semester) 2012-13, C Programming (CS 1101)

Time: $2\frac{1}{2}$ hours

Maximum Marks: 40

1.What will be the output of the following program and justify your answer. [Marks: 2x5=10]

(i)
```
#include<stdio.h>
int main()
{
int a[5] = {5, 1, 15, 20, 25};
int i, j, m;
i = ++a[1];
j = a[1]++;
m = a[i++];
printf("%d, %d, %d", i, j, m);
return 0;
}
```

(ii)
```
#include<stdio.h>
void fun(int*, int*);
int main()
{
int i=5, j=2;
fun(&i, &j);
printf("%d, %d", i, j);
return 0;
}
void fun(int *i, int *j)
{
int t;
t=*i;
*i=*j;
*j=t;
}
```

(iii)
```
#include<stdio.h>
int main()
{
int i=5,j=5,y;
int x=++i + ++i + ++i;
y=++j + ++j + ++j;
printf("%d %d %d %d",x,y,i,j);
return 0;
}
```

(iv)
```
#include<stdio.h>
int main(){
static int a[2][2] = {1, 2, 3, 4},int i,j;
static int *p[] ={(int*)a, (int*)a+1,
(int*)a+2};
for(i=0; i<2; i++)
{
for(j=0; j<2; j++)
{
printf("%d, %d, %d, %d\n",*(*(p+i)+j),
*(*(j+p)+i), *(*(i+p)+j), *(*(p+j)+i));
}
}
return 0;
}
```

(v)
```
#include<stdio.h>
int main()
{
void *vp;
char ch=74, *cp="JACK";
int j=65;
vp=&ch;
printf("%c", *(char*)vp);
vp=&j;
printf("%c", *(int*)vp);
vp=cp;
printf("%s", (char*)vp+2);
return 0;
}
```

2.Give answer of the following objective questions and justify it. [Marks: 2x2=4]

(i)
```
#include<stdio.h>
int main(){
int i=4, j=-1, k=0, w, x, y, z;
w = i || j || k;
x = i && j && k;
y = i || j &&k;
z = i && j || k;
printf("%d, %d, %d, %d\n", w, x, y, z);
return 0;
}
```

(a)1,1,1,1(b)1,1,0,1 (c) 1,0,0,1 (d)1,0,1,1

(ii)
```
#include<stdio.h>
int main(){
int a = 500, b = 100, c;
if(!a >= 400)
b = 300;
c = 200;
printf("b = %d c = %d\n", b, c);
return 0;
}
```

(a)b=100,c=200 (b)b=300,c=200
(c)b=100,c=garbage (d) b=300,c=garbage.

3. Point out the Errors in the program and correct them and justify your Answer. (Marks:1.5x4=6)

(i)
```
#include<stdio.h>
int main()
{
int P = 10;
switch(P)
{
case 10:
printf("Case 1");
case 20:
printf("Case 2");
break;
case P:
printf("Case 2");
break;
}
return 0;
}
```

(ii)
```
#include<stdio.h>
#include<stdlib.h>

int main()
{
unsigned char;
FILE *fp;
fp=fopen("trial", "r");
if(!fp)
{
printf("Unable to open file");
exit(1);
}
fclose(fp);
return 0;
}
```

(iii)
```
#include<stdio.h>
int f(int a)
{
a > 20? return(10): return(20);
}
int main()
{
int f(int);
int b;
b = f(20);
printf("%d\n", b);
return 0;
}
```

(iv)
```
#include<stdio.h>
int main()
{
char str[] = "Nagpur";
str[0]='K';
printf("%s, ", str);
str = "Kanpur";
printf("%s", str+1);
return 0;
}
```

Write the program for the following questions

Note: Inside the main you will call the function

[Marks: 4x5=20]

4. WAP to take two array such as a1 and a2 Performs following operations.

1.Merging of two arrays.
2.Search an element in an array by using Binary search.

5. WAP to print the following patterns:

(a)
```
1
22
333
4444
55555
```

(b)
```
* * * * *
* * * *
* * *
* *
*
```

6 . Write a program to check the frequency of characters and numbers by using pointer.

7. Create a structure for student record to contain name, roll number, age ,date of birth and total marks obtained in a class. Developed a program to read data for 10 students in a class and list them rank wise. Use array of structure in the program.

8. Write a program to open a new file f1 and write a sentence "MNNIT ALLHABAD IS BEST" and save it in the file f1.After That, open the same file f1 in read and write mode and copy the contents of file f1 in another file f2.

Department of Computer Science and Engineering
Motilal Nehru National Institute of Technology, Allahabad
End Semester Exam (Even semester) 2012-13
B.Tech 2nd Semester (Section A,B,C & G)
CS (1201) Computer Programming

Time: 2:30 hours **Maximum Marks:40**

Note: Attempt all questions

1. What will be the output of the following program and justify your answer. [5X1]

(i)
```
#include<stdio.h>
int fun(){
static int num =40;
return num--; }
int main(){
for(fun(); fun(); fun()){
printf("%d ", fun());}
return 0;}
```

(ii)
```
#include<stdio.h>
int main() {
char *s[] = { "knowledge","is","power"};
char **p;
p = s;
printf("%s ", ++*p);
printf("%s ", *p++);
printf("%s ", ++*p);
return 0; }
```

(iii)
```
#include<stdio.h>
int main(){
int arr[] = {10, 20, 30, 40, 50, 60};
int *ptr1 = arr;
int *ptr2 = arr + 5;
printf ("ptr2 - ptr1 = %d\n", ptr2 - ptr1);
printf ("(char*)ptr2 - (char*) ptr1 = %d",
(char*)ptr2 - (char*)ptr1);
return 0;}
```

(iv) What will be the content of 'file.c' after Executing the following program? Justify your answer.
```
#include<stdio.h>
int main()
{
FILE *fp1, *fp2;
fp1=fopen("file.c", "w");
fp2=fopen("file.c", "w");
fputc('hello', fp1);
fputc('world', fp2);
fclose(fp1);
fclose(fp2);
return 0;}
```

(v)
```
#include <stdio.h>
int counter(int i){
static int count = 0;
count = count + i;
return count;}
int main(void){
int i, j;
for (i = 0; i <= 5; i++)
j = counter(i);
printf("%d\n", j);
return 0;}
```

2. Are the following two statements Identical or not ? justify your answer. [1]

```
char str[6] = "Kicit" ;
char *str  = "Kicit" ;
```

3. Is the following code fragment correct or not? Justify your answer. [1]

```
const int x = 10 ;
int arr[x] ;
```

4. What does the following function return? you can assume the value of a,b,c? [2]

```
int f(){
int a,b,c;
if(a>b)
if(a>c)
if(c>b) return c;
else return b;
else return a;
else if(c>a)
if(c>b) return b;
else return c;
else return a;
}
```

5. A student record consists of following information:*name,roll,phy_marks,chem_marks,maths_marks,totalphy_marks,chem_marks,maths_marks* are marks of a student(out of 100) in three subjects physics, chemistry and mathematics respectively. *total* is the aggregate of all the marks of a student. A student can pass the examination if he/she has secured minimum 40 marks in each subject. Write a program which writes a set of *n* such student records in a binary file whose name is given along the command line. After writing the student records program will read a set of roll numbers(in any order) terminated by zero and check if student with that roll number has passed or not .If the student has failed then give 2 marks as grace in each subject and check whether student passed or failed. [5]

6. What is an associatively and precedence of an operator? Show the chart for the precedence and associatively for operators categories? [3]

7. Define the concept of pointer? Also define the dynamic memory allocation and various functions for dynamic memory allocation, with suitable examples. [5]

8. Define the number system and also classify the number system with suitable example and convert the following number system according to their bases. [1X4]
(i) (243)8 = (?)2 (ii) (4AB.DEF)16 = (?)2
(iii) (1100.1011) 2 = (?)10 (iv) (105.67)8 = (?)16

9. What do you mean by scope & life of a variable? Explain briefly different storage classes in C. [3]

10. Explain four different types of errors i.e. Syntax errors, Run time errors, Logical errors and Latent errors. [2]

11. Write a C program for reading an employees file containing {emp_number, name, salary, address}. Create an output file containing the name of those employees along with their salary and address whose. salary is > 20,000. [5]

12. Write the program for sort the name of 10 student (character and alphabetically) using pointer. Inside the main you must call only a single function. [4]

Motilal Nehru National Institute of Technology Allahabad

Department of Computer Science & Engineering

B.Tech (Section - D/E/F) I Semester (End Semester Exam)

December 2014

CS 1101: Computer Programming

M.Marks: 60 Time : 180 Minutes

NOTE:

- Attempt all the questions of a section at same place.
- Answers should be Justified & to the point

Section A [2*5=10 Marks]

Assume library (#include<stdio.h>, #include<math..h>, #include<string.h>), and return 0 and main function if missing. Give the outputs of the following program segments assuming 32 bit compiler.*Justify your output.*

1.

```
main( ){
char str[]="Escape Sequence";
char *a, *b;
for (a = str, b = str; b < a + strlen (str)-4; b++)
printf("%c", * (str +b));
}
```

2.

```
void fun(int *p)
  {
int i,sum=0;
sum+=*(p+i);
        printf("%d",sum);
  }
 void main( )
 {
  int a[5]={10,20,30,40,50};
  for(i=2;i<4;++i)
  fun(a+1);
 }
```

3.

```
main(){
 char *s[]={"NIT","MNNIT","IIIT","IITKGP"};
 char **ptr[]={s+3,s+2,s+1,s};
 char ***P=ptr;
 printf("\n%s",**++P);
 }
```

4.

```
#include <stdio.h>
 int h ( int a , int b )
 { a = b - a; return b - a; }
 int main ()
 {
 int a = 9, b = 2;
 a = h(a,b);
 b = h(a,b);
 printf("%d\n", a);
 }
```

5.

```
#include <stdio.h>
        int *what ( int *p )
        {
        ++p; *p = 10; ++p;
        return p;
        }
        int main ()
        {
                int A[] = {1,2,3,4,5}, *p;
                p = what(A);
                printf("%d\n", p[0]);
        }
```

P.T.O.

Section B [3*10=30 Marks]

1. The following declaration is confusing:
   void f(const int *p);
   Does this say that f can't modify p? Explain. When declaring a parameter of pointer type, is it legal to put the word const in front of the parameters name, as in following example?
   void f(int *const p);
   Explain.

2. Why pointers should have data types when their size is always 4 bytes (in 32-bit machine), irrespective of the variable they are pointing to? Explain with an example.

3. How can a one dimensional array of pointers be used to represent a collections of strings?

4. How is the library function malloc() used to associate a block of memory with a pointer variable? How is the size of the memory block specified ? What kind of information does the malloc function return? Differentiate between malloc() and calloc().

5. What is the advantage of using register storage class? What are the restrictions with register storage class? Differentiate between internal static and external static variable.

6. How the structure is different from array and union? Explain with examples.

7. Differentiate between binary search and linear search in terms of complexity and applicability.

8. Illustrate the initialization of one dimensional arrays, two dimensional arrays, and strings.

9. How can we pass two dimensional array in function. How the two dimensional array is processed through pointers?

10. Write a user defined function to compare two strings of different length.

Section C [5*4=20]

1. We have set of 'n' elements, divide it into two sets A and B such that sum of elements in set A is equal to sum of elements in set B.

2. Write a function to find the position 'p' of the first occurrence of element 'e' in the array. Array is sorted. Your code should make logarithmic comparisons of array elements.

3. Write a program to read a text, delete all the semicolons it has, and finally replace all '.' With a ','.

4. What are the advantages of object oriented programming over procedural programming Languages. Differentiate between C++ and Ansi C .

Motilal Nehru National Institute of Technology Allahabad
Department of Computer Science & Engineering
B.Tech (Group- A/B/C/G) II Semester (End Semester Exam)
May 2018

CS 12101: Computer Programming

M.Marks: 60 **Time : 180 Minutes**

NOTE:
- All sections are compulsory
- Attempt the questions **strictly** in sequential order.
- Answers should be justified & to the point

Assume library (#include<stdio.h>,#include<string.h>, #include<math.h>), and return 0 and main function if missing. Give the outputs of the following program segments assuming 32 bit compiler. Justify your output through explanation.

SECTION A [2.5*4=10 Marks]

What is the output printed by the following segments of C code? Justify your answer, 1 marks is for the correct output and 1.5 marks for Justifications.

a)
```
#include<stdio.h>
main(){
int m=1,n=2;
for( ; m+n<10; n++)
{
switch(m != n){
case 1: m*=2;
break;
default: m*=1;
}}
printf("m=%d n=%d",m,n);}
```

b)
```
#include <stdio.h>
void aup3(int,int *,int,int *);
int main()
{int a[5]={5,4,3,2,1};
inti,sum = 4;
aup3(a[1],a+2,a[2],&sum);
printf("sum = %d\n",sum);
for(i=0;i<5;i++)
printf("%d ",a[i]);
printf("\n");
return 0;}
void aup3(int a, int *b, int c, int *total)
{int sum;
sum = a+*b+c;
total = &sum;
*(b-1)=10;
*(b+2)=20;
a=14;
c=11;}
```

c)
```
#include <stdio.h>
int f(int x, int *py, int **ppz){
int y, z;
 **ppz += 1;
z = **ppz;
 *py += 2;
 y = *py;
 x += 3;
return x + y + z;}
void main() {
int c, *b, **a;
  c = 4;
  b = &c;
  a = &b;
printf( "%d", f(c,b,a));
printf("\nc=%d",c); }
```

d)
```
#include<stdio.h>
void fun(int);
void fun (int n){
if (n <=1) {
printf ("%d", n);}
else {
fun (n/2);
printf ("%d", n%2);}
}
main(){
        int x=173;
        fun(x); }
```

SECTION B (2*4=8 Marks)

1. Write a C program that accepts (from the keyboard) a positive integer less than 1000 and prints out the sum of odd digits and even digits of this number if entered value will be positive integer less than 1000.
   Example:
   Enter a +ve no less than 1000: -4
   Entered number is out of range
   Enter a +ve no less than 1000: 1234
   Entered number is out of range
   Enter a +ve no less than 1000: 546
   Sum of odd digits of 546 is 5
   Sum of even digits of 546 is 10.

2. (Bar Chart Printing Program) One interesting application of computers is drawing graphs and bar charts (sometimes called "histograms"). Write a program that reads five numbers (each between 1 and 30). For each number read, your program should print a line containing that number of adjacent asterisks. For example, if your program reads the number seven, it should print *******.

3. A college offers a course that prepares students for the state licensing exam for real estate brokers. Last year, 10 of the students who completed this course took the *licensing* examination. Naturally, the college wants to know how well its students did on the exam. You have been asked to write a program to summarize the results. You have been given a list of these 10 students. Next to each name a 1 is written if the student passed the exam and a 2 if the student failed.

   Your program should analyze the results of the exam as follows:

   i. Input each test result (i.e., a 1 or a 2). Display the prompting message "Enter result" each time the program requests another test result.
   ii. Count the number of test results of each type.
   iii. Display a summary of the test results indicating the number of students who passed and the number who failed.
   iv. If more than eight students passed the exam, print the message "Bonus to instructor!"

4. Write a C program to print following pattern:

```
        1
      3 2 1
    5 4 3 2 1
  7 6 5 4 3 2 1
    5 4 3 2 1
      3 2 1
        1
```

SECTION C (3*2=6 Marks)

1. Write a C program to take an array of n elements and then find the minimum difference between any two elements in an array.
   For example:-
   Input: arr[] = {1,5,3,19,18,25}
   Output : 1
   Minimum Difference is between 18,19.

   Input: arr[] = {30,5,20,9}
   Output : 4
   Minimum Difference is between 5,9.

2. A 4-digit number WXYZ is called an Ordered Number if the difference between the first two digits, WX, and the last two digits, YZ, is equal to 1 (WX-YZ=1 or YZ-WX =1). For example, 1213 and 4645 are Ordered Numbers, while 2345 and 7685 are not Ordered Numbers. Write a program that will only accept a 4-digit number and will determine if it is an Ordered Number. Test your program with the numbers: 1213, 2345 and 4645.
   Sample Run:
   ENTER A 4-DIGIT NUMBER: 1213
   1213 IS AN ORDERED NUMBER.

Section A [1*5=5 Marks]

Assume library (#include<stdio.h>, #include<math_h>,), and return 0 and main function if missing. Give the outputs of the following program segments assuming 32 bit compiler. *Justify your output.*

1.

```
#include<stdio.h>
int main(){
  int a=5,b=10,x;
  if((a<++a||b<++b&&b<a++)?x=a|b:b)
     printf("%d%d%d",a,b,x);
  else
     printf("John Terry");
}
```

2.

```
#include<stdio.h>
int main(){
  int a=2,n;
  if(a--,--a,a)
     if (++a <= 5)
     printf("n=%d\n", n);
  else
     printf("Jim Rogers");
  else {
  int s,x;
     for(s=0;x>0;s+=x%10,x/=10);
printf("s=%d  x=%d a=%d",s,x,n);
}
}
```

3.

```
#include<stdio.h>
int main()
{  int i,a,b,sum;
for(i=10;i<100;i++)
 {      a=i/10;      b=i%10;      sum=a+b;
  if(i==(a-4) && (i%sum)==7)
   printf("%d\n",i);
   }
   return 0;
   }
```

4.

```
#include<stdio.h>
int main() {
int i = 4;
switch (i)
{
default: ;
case 3:
i += 5;
if ( i == 8)
{
i++;
if (i == 9) break;
i *= 2;
}
i = 4;
break;
case 8:
i += 5;
break;
}
printf("i = %d\n", i);
}
```

5.

```
#include<stdio.h>
int main(void)
{
  int y = 0,z=0,x=0,x;
  for(y = 1; y < 98; y++)
  {
    if( y == 20 )
    {
      continue;
    }
    for( z = 1; (z + y) < 98 ; z++)
    {
      x = y + z;
      if ( x < 53 || x > 99){
        continue;}
      if(x * x == ((100 * y) + z)){
       printf(" The number which follows the property ( 45 * 45 = 2025 ; 20 + 25 = 45 ) is %d  And the  property is ( %d * %d = %d ; %d + %d = %d)", x, x, x, (x * x), (x *x)/100, (x *x)%100, x);
      }
    }
    } return 0;
}
```

1. What is difference between declaring a variable and defining a variable? Why data type is specified for a variable declaration?

2. Describe the two ways of multi-way selection in C programming language. Differentiate between continue and break statement.

Section C [2.5*2=5 Marks]

1. Write a program using switch case to display a menu that offers five options: read three numbers, calculate total, calculate average, display the largest, display the smallest, and display the second largest.

2. A right triangle can have sides that are all integers. The set of three integer values for the sides of a right triangle is called a Pythagorean triple. These three sides must satisfy the relationship that the sum of the squares of two of the sides is equal to the square of the hypotenuse. Find all Pythagorean triples for side1, side2, and the hypotenuse all no larger than 500.Use a triple-nested for loop that simply tries all possibilities.

Section B [2.5*4=10 Marks]

1. Describe the structure of a C program. Write the process of creating and executing a C program under UNIX system. Describe the process of compilation, linking and loading.

2. Differentiate between Type conversion and Type casting with examples. When should a type cast be used?

Motilal Nehru National Institute of Technology Allahabad, Prayagraj
Department of Computer Science & Engineering
B.Tech (Group- A/B/C/G/H/J), II Semester (End Semester Exam)
2018-19
CS12101/CS1201: Computer Programming

M.Marks: 60 Time : 180 Minutes

Vaibhav Kumar 2018204

NOTE:
- All sections are compulsory
- Attempt the questions strictly in sequential order.
- Answers should be justified & to the point

Assume library (#include<stdio.h>,#include<string.h>, #include<math.h>), and return 0 and main function if missing. Give the outputs of the following program segments assuming 32-bit compiler. Justify your output through explanation.

SECTION A [2.5*4=10 Marks]

What is the output printed by the following segments of C code? Justify your answer. 1 mark is for the correct output and 1.5 marks for Justifications.

A.

```
#include <stdio.h>
int f(int x, int *py, int **ppz){
int y, z;
**ppz += 1;
z = **ppz;
*py += 2;
y = *py;
x += 3;
return x + y + z;}
void main() {
int c, *b, **a;
c = 4;
b = &c;
a = &b;
printf( "%d", f(c,b,a));
printf("\nc=%d",c); }
```

B.

```
#include<stdio.h>
void count(int n)
{ static int d = 1;
  printf("%d", n);
  printf("%d", d);
  d++;
  if(n > 1) count(n-1);
  printf("%d", d);
}
int main()
{  count(3); }
```

C.

```
# include <stdio.h>
int total(int v)
{ static int count = 0;
  while (v) {
  count += v & 1;
  v >>= 1;
  }
  return count; }
void main()
{
static int x = 0;
int i = 5;
for (; i> 0; i--) {
 x = x + total(i);
 }
printf ("%d", x);
}
```

D. The most appropriate matching for the following pairs

X: m=malloc(5), m= NULL;	1: using dangling pointers
Y: free(n); n->value=5;	2: using uninitialized pointers
Z: char *p, *p = 'a';	3. lost memory or memory leakage

(a) X—1 Y—3 Z-2
(b) X—2 Y—1 Z-3
(c) X—3 Y—2 Z-1
(d) X—3 Y—1 Z-2

SECTION B [3*6=18 Marks]

2. a) C program to store Student records for n students as Structures and Sort them by Name using Dynamic memory allocation. Student records contain its name, roll number, age and SPI.

b) Explain different bitwise operator with example.

3. a) Discuss pointer arithmetic with suitable Examples?

b) Write a program to convert decimal number to its binary equivalent using bitwise operator
Example:-
Decimal Number: - 19
Binary Equivalent: - 10011
Assume integer takes 2 byte memory.

4. Write a program to give an array of integers and find number of subset, such that the sum of the element of subset is divisible by m.
For example: Input: arr[ ] = {1, 2, 3, 4};
M=3;
Output: 7

SECTION C [8*4=32 Marks]

5. Give brief introduction of the following with Suitable example.
   i. Dynamic Memory Allocation.
   ii. Array of pointers.
   iii. Type conversion.
   iv. Structure Vs Union.

6. This C program can be used to read item details used in party and calculate all expenses, divide expenses in all friends equally. (**Hint**: -using structure)
This program will read item name, price, quantity and calculate amount (price*quantity), using this program maximum 50 items can be read and calculate the total paid amount. (You can change the maximum number of items according to party items.)

7. Write a function **xstrchr()** that will scan a string from beginning to end in search of a character. If the character is found it should return a pointer to the first occurrence of the given character in the string. If the given character is not found the function should return a **NULL**.

8. a. Write a program in C to copy contents of one file to another file.

b. Write a program to given an array of integers of size 'n' and an integer 'k', you have to perform the Bitwise AND operation between any array element and 'k' any number of times. The task is to print the minimum number of such operations required to make any two elements of the array equal. If it is not possible to make any two elements of the array equal after performing the above mentioned operation then print '-1'.

For Example: Input: k = 2 Array: {5, 6, 2, 4}
Output: 1

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
MOTILAL NEHRU NATIONAL INSTITUTE OF TECHNOLOGY ALLAHABAD
End Semester Exam (Odd Semester) 2015-16
Computer Programming
(Old & New Curriculum)
B.Tech I sem - Section D, E & F

Maximum Marks: 60

Time: 3 hours
Note: Attempt all questions. Write to the point.

1. Discuss Insertion Sort Algorithm in detail. How it is designed, Write its C program. **[2+2+4]**

2. How Structures are declared in C language. Write a C Program to store and print data of 30 students using structure. For each student following data is required: Registration Number, Name, Date of Birth and Age. **[3+6]**

3. What is a Pointer? Write a Program to print the elements of a single dimensional array using two pointers. **[2+5]**

4. What is an Object Oriented Programming? Why it is better than Procedural Oriented Programming? Explain Encapsulation, Data Hiding, Inheritance and Polymorphism. **[2+2+4]**

5. Write a program to convert a binary number to decimal number and vice versa. **[3+3]**

6. Which standard Programming Technique is used in designing Binary Search Algorithm? Explain how this technique works. List all programming technique with their examples. Write the algorithm and program for Binary Search. **[2+2+2+4]**

7. For the given list of 10 numbers **[2+2+4+4]**

   8, 15, 7, 1, 2, 3, 6, 14, 13, 17

   Write the following programs

   a. Find out the average of list.
   b. Insert a new element 21 after element 1 and create new list 8, 15, 7, 1, 21, 2, 3, 6, 14, 13, 17.
   c. Delete 13 from this list and reprint the series 8, 15, 7, 1, 21, 2, 3, 6, 14, 17.
   d. Subtract largest element from each element and print the average of modified list

*******End of Paper*******