University of Rajshahi

Department of Computer Science and Engineering

B. Sc. (Engg) Part-I Odd Semester Examination 2014

Course: CSE-1121 (Computer Programming with C)

Full Marks: 52.5 Duration: 3(Three) Hours

Answer 06(Six) questions taking any 03(Three) questions from each section in separate answer script

Section - A

1. a) Mention the advantages of high level programming language. Differentiate between compiler and interpreter. 3
   b) Differentiate between pseudo-code and algorithm with example. 2
   c) You are given an array containing some real numbers. You are asked to develop a program to find the average of positive and negative numbers separately. Draw the flowchart to solve the problem. 2
   d) Find and explain the output of the following program: 1.75

```
void main() {
      int a=5, b=15, r, s;
      r=a<8;
      s=(a<10)&&(b==12);
      printf("r=%d, s=%d", r, s);  }
```

2. a) What is meant by constant and variable? Write down the name of different constant types. 3
   b) Define escape sequence. List any 5(five) escape sequences used in C programming. 2
   c) Distinguish between unary and binary operator with example. 2
   d) Find the output of the following code. 1.75

```
void main() {
      int i = 10, j = 20 ;
      float a, b, c;
      a = i / j;
      b = 1.0 * i / j ;
      c = i / j * 1.0;
      printf("%f %f %f ", a, b, c);  }
```

3. a) How the value of an expression can be converted to a different data type? Consider the expression `x=(y+z)%4;` if the value of `y` and `z` are `5` and `5.5` respectively, what will be the value of `x`? Explain the reason of output. 2
   b) Explain bitwise AND and OR operation with example. If `x=5; y=11;` what is the value of `(x&y|2)` and `(x|y==3)`? 3
   c) Explain the purpose of keyword "`void`" and "`return`" statement. 2
   d) Explain the output of the following block of C code: 1.75

```
void main() {
     int i=4, j ;
     j = ++i * i++;
     i *= j;
     printf("%d %d",i,j);  }
```

4. a) Explain the difference of while and do – while loop with example. 2
   b) What is the purpose of break statement? Suppose you are given an integer (positive and negative) type array containing n elements. Write a C code to find the position of first occurrence of negative number in the array. It is required to stop the searching when the first negative integer is found. 3
   c) How the following statements are interpreted? 2

```
if   e1 if e2 s1
else s2
```

Which logical expression is associated with `else` clause?

1.75

d) Explain the output of the following C code:

```
main() {
    int *a, b = 30;
    a = &b;
    b = *a + 40;
    a = b % 5;
    printf("%d %d",*a , b); }
```

Section – B

5. a) Define function and function prototype with examples. Why function prototype is used in C? 2
   b) Explain formal and actual parameter with examples. 2
   c) Write a recursive function in C programming that will return the sum of the series $1+2+3+\ldots+n$. Here n is a positive integer. 2
   d) Distinguish between "function call by value" and "function call by reference". Explain with example. 2.75

6. a) Compare global variable and local variable with example. 1.75
   b) What is the relation between pointer and single-dimension array? Give example. 2
   c) Define dynamic memory allocation. Why it is required? 2
   d) Explain the following C declarations. i) `int *p[10];` ii) `int (*p)[10];` iii) `int *p(char *a[]);` 3

7. a) What is user-defined variable? Why it is required for C programming? 1.50
   b) Distinguish between structure and union. 1.75
   c) Define self-referential structure with example. 1
   d) Write a C program that will define a structure **time** which contains three integer variables **hours**, **minutes** and **seconds** where **0≤hours≤23** and **0≤ minutes, seconds ≤59**. Then the program will read the beginning and ending time of an event from input console and pass them to a function that compute and print the duration of the event. For example, if an event begins at 21:55:34 and ends at 03:25:21 then the duration of the event is 05 hours 29 minutes and 47 seconds. Consider that the maximum duration of an event is less than 24 hours. 4.50

8. a) Describe different types of file opening mode to open a data file. 3
   b) Define command line arguments. Give an example for passing command line arguments in a C program. 2.5
   c) Consider the following C program. 3.25

```
#include <stdio.h>
int main()
{
    int i =10, n=0;
    while(i>1)
    {
        if(i&1==1)
        {
            i+=i<<2;
            i=i|1;
        }
        else i>>=1;
        n++;
    }
    printf("%d %d",n,i);
    return 0;
}
```

Compute the output of the above program.

University of Rajshahi
Department of Computer Science and Engineering
B.Sc. (Engg.) Part-1 Odd Semester Examination 2015
Course: CSE 1121 (Computer Programming with C)
Full Marks: 52.5 Time: 3 Hours

Answer Six (06) Questions taking any Three (03) from each section in separate answer script

Section A

1.(a) What is run-time error? Give an example. 2

(b) What are local and global variables? 2

(c) What are the syntax errors (if any) of the following code? 4.75

```
#include <conio.h>
int 1x,2x, y1,y2;
float z;
char a[10], b[10];
Main()
{
  scanf("%d%d%f",y1,z);
  scanf("%c%c%c), &a[1],a[2],&a[3]);
  b[2]=a[2 ];
  y2=b[2]+a[1]+y1;
  printf("%f%f%f%d%d",&y1,z,y2,z,a[3]);
}
```

2.(a) What are the uses of 'break' statements? Give an example. 3

(b) What will be the output of the following statements? 3

```
printf("%5d\n",123);
printf("%-5d\n",123);
printf("%05d\n",15);
printf("%3.2f\n",3.14159);
printf("%x\n",255);
printf("%o\n",255);
```

(c) Write a function named *' int floatInteger(float n)'* to decide whether a number, n, is a floating point or pure integer. Your function will return '1', if n is a floating point number otherwise '0'. 2.75

3.(a) Suppose, you are given an array of 'n' integers. You are asked to develop a program to sort that array in ascending order using at most one extra variable. Draw a flowchart to solve the problem. 4

(b) What will be output of the following code? 4.75

```
int x[10] = {1, 4, 3, 6, 8, 2, 9, 0, 5, 7};
int i,j,k,tmp,big,p;
main() {
 for (i=1;i<=5;i++)
 {
 big=x[i];
  for(j=i; j<=5; j++)
     {if(x[j]> big) p=j+1;}
     tmp=x[p];     x[p]=x[i];       x[i]=tmp;
}
for (k=1;k<8;k++) printf ("%d -th  %d\n",k,x[k]);
}
```

(b) What will be output of the following code? 3.75

```
int i,j;

main() {

 for (i=1;i<=7;i++)
 {
  for (j=2; j<=7; j++)
  { if (i==j-1) printf("A"); else printf("0"); }
  printf("\n");
 }
}
```

(c) Why do we need to use '*fclose(fp)*'? 1

Section-B

5.(a) What is the deference between function declaration and function definition? 2

(b) Correct the following C programs so that you can compile them successfully. 1.25+2

a.c

```
/* Date: 5.3.2015
main(){
   int i,
   for(i=0, i<5, i++){
      scanf("%d",x)
      printf("%d\n",x)
   }
```

b.c

```
#include<stdio.h>
main(){
  int x,sum;
  float y;
  scanf("%d",x);
  sum=summation(x,y);
}
```

(c) What will be output of the following code? 3.5

```
main() {
    int a,b,c,d,*x,*y;

    a=5; b=10; x=&c; y=&d; c=20; d=30;
    printf("Before calling  %d %d %d %d\n",a,b,*x,*y);
    func1(&c,&d,&a,&b);
    printf("After calling  %d %d %d %d\n",a,b,*x,*y);
}

void func1(int *p, int *q, int *r, int *s){
   *p=100; *q=200; *r=300; *s=400;
}
```

6.(a) What is a pointer? Is there any relation between a pointer and the name of a one-dimensional array? 2

(b) What will be output of the following code? 3.5

```
void func1(int a, int p, int q[]);
int x, y;
main(){
    int a,b,c[3];
    a=10;b=20;c[1]=1,c[2]=2;
    x=100;y=200;
    printf("Before %d %d %d %d %d %d \n",a,b,c[1],c[2],x,y);
    func1(a,b,c);
    printf("After %d %d %d %d %d %d \n",a,b,c[1],c[2],x,y);
    getch();
}
```

```
void func1(int a, int p, int q[]){
    int x;
    a=100;
    p=200;
    q[1]=q[1]+2;
    q[2]=q[2]+2;
    x=102;
    y=202;
}
```

(c) Write a program to take two matrices **A**[n][n] and **B**[n][n] from the keyboard. Set the value of each cell of a row of the matrix **C**[n][n] with biggest value of respective two rows of matrix **A** and **B**. The maximum size of 'n' is 10. 3.25

7.(a) What is the difference between "structure" and "union"? Give an example to explain it. 3

(b) Let the contents of file named "data.dat" : 4

1 2 3 4 5
2 3 4 5 6
3 4 5 6 7
4 5 6 7 8
5 6 7 8 9

Write a program to read those values from that file and print the sum of each row in another file named "output.dat". The contents of "output.dat" look like:

15
20
25
30
35

(c) How many times will "Bangladesh" be printed on screen? 1.75

(i) for(i=0; i<=6; i++) printf("Bangladesh\n");
(ii) for(i=0; i<6; i++) printf("Bangladesh\n");
(iii) for(i=2; i<=9; i++) printf("Bangladesh\n");
(iv) for(i=0; i<=9; i--) printf("Bangladesh\n");

8.(a) Does it make any difference if you compile any C program by typing '*gcc hello.c*' or '*gcc hello.c –o hello.o?*' 1

(b) (i) Write a structure named 'familyInfo' having the members: 'motherName' and 'fatherName' as string, 'childNo' as integer, 'income' and 'expenses' as floating point numbers. 2

(ii) How many bytes are required for the above mentioned structure definition? 1

(iii) How many bytes are required if the above definition is 'union' instead of 'structure'? 1

(iv) Write a C program using that structure to take 10 families' information from keyboard and save into structure. 3.75

Dept. Computer Science and Engineering
University of Rajshahi
Semester Final Examination, B.Sc. Engg. 2016, 1st year, Odd semester,
Course ID: CSE -1121 Course Title: Computer Programming with C
Total Time 3 Hours Total Marks 52.5
Answer any **six** questions taking **three** from each section

Section A

1(a) (i) If int i = 7, float f = 5.5, char c = 'a'; What will the output of (a) 'i + c' and (b) 'i + f' 3
(ii) If int result, i = 7, f = 8.5, What will the output of ' result = (i + f) % 4'
(iii) If float num = 10.5, What will the output of 'num % 2' and '((int)num) % 2'

(b) What will be simplified form of (a) !(a<b) , (b) !(c<=d), (c) !(x=>y) ? 1.5

(c) What will be the output of the following code? 4.25
(Objective of the question: To check the formatting knowledge)

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

 main()
{
    printf("%7d\n",123);
    printf("%-4d\n";123);
    printf("%07d\n",15);
    printf("%4.3f\n",3.14159);
    printf("%x\n",127);
    printf("%o\n",127);
    getch();
}
```

→ x = Hexadecimal
→ o = Octal

2(a) What will be the output of the following code? 2.75

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

int i,j;
main()

{
 i=1;
 while(i<=5)
 {
 for (j=1; j<=6; j++)
    {if (i==j)
     printf("X");
     else
     printf("Y");
     }
    i=i+1;
    printf("\n");
}

}
```

(b) List the syntax error (if any) of each line of the following code? 6
(Objective of the question: To check the knowledge of basic C syntax)

```
#include <conio.h>
int 1x,2x, y1,y2;
float z;
char a[10], b[10];
Main()
{
scanf("%d%d%f",y1,z);
scanf("%c%c%c), &a[1],a[2],&a[3]);
b[2]=a[2];
```

→ Error ⇒ scanf("%d%d%f", &y1, &y2, &z);

```
y2=b[2]+a[1]+y1;
printf("%f%f%f%d%d",&y1,z,y2,z,a[3]);
}
```

3(a) What is the difference between 'while' and 'do-while' loops? 2

(b) What will be the output of the following program? 6.75
(Objective of the problem: The check the capacity of four-layer nested loop control)

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

int x[5][5]={   {1, 4, 3, 6, 8},
                {2, 9, 0, 5, 7},
                {5, 9, 6, 7, 6},
                {9, 0, 2, 6, 8},
                {3, 6, 0, 1, 7} };

int i,j,k,l, tmp,big,p;

main() {

 for (i=0;i<=4;i++)
 {
   for(j=0; j<=4; j++)
   {
     for(k=j; k<=4; k++)
     {
       for(l=k ; l<=4; l++)
       {
       x[k][l]=x[k][l]+1;
       }
     }

   }
 }


for (i=0;i<=4;i++)
 {
   for(j=0; j<=4; j++)
   {
     printf ("%d ",x[i][j]);
   }
   printf ("\n ");
 }

getch();
}
```

4(a) What is the purpose of the switch statement? How does this statement differ from the other statements? 2.5

(b) What is the difference between the break and continue statement? 2.5

(c) Write a fragment of program that makes use of the goto statement. 3.75

Section-B

5(a) What are the advantages of using functions? 2

(b) What are the differences between passing an array to a function and passing a single-valued data item to a function? 2

(c) What will be the output of the following code? If you think any value displayed may be garbage, mention it as garbage too. Explain how the variables take the values. 4.75
(Objective of the question: To check the concepts of local and global variables)

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

garbage collection

```
void add_int(int n);

int x,p,q;

int main(){
   int p;
   q=200;
   x=10;
   printf("\nBefore calling x=%d  p=%d  q=%d",x, p, q);
   add_int(x);
   printf("\n After calling x=%d  p=%d  q=%d",x, p, q);

}

void add_int(int x){
   x=50;
   p=200;
   q=300;
    }
```

6(a) What conditions must be satisfied by all of the elements of any given array? 1.75

(b) What will be the output of the following code 5
(Objective of the question: Check the concepts of pointers)

```
void func1(int *p, int *q, int *r, int *s);

main() {
     int a,b,c,d,*x,*y;

     a=15; b=100; x=&d; y=&c; c=25; d=300;
     printf("Before calling  %d %d %d %d\n",a,b,*x,*y);
     func1(&c,&d,&a,&b);
     printf("After calling  %d %d %d %d\n",a,b,*x,*y);
     getch();
}

void func1(int *x1, int *x2, int *x3, int *x4)
{
   *x1=100; *x2=200; *x3=300; *x4=400;
}
```

(c) Can entire arrays be processed with single instructions, without repetition? 2

7(a) Write a program to read a **n** bit long binary stringand then search how many times pattern '000' occurs. Do not considersame '0' in two adjacent '000' pattern. For example '100001' or 1000001' has only one '000' pattern, but '100000001' has two '000'. 3.5

Sample input: 10100011100100001011000010000001110
Output: 5

(b) What will be the output of the following code?(Objective of the question: To check the knowledge of recursive function) 5.25

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

int y(int n);

int main(){
   int x;
   x=y(50);
   printf("Final Output=%d",x);
   getch();
}

int y(int n){
```

```
if(n==0)
  {
   printf("In Terminating Condition= %d \n",n);
       return n;
  }
 else
       { printf("In Recursive Calling =%d\n", n);
       return n+y(n-5);
       }
  printf("CSE %d Times\n",n);
}
```

8(a) Draw the 'flow chart' to find out the 'biggest number' from given 10 integers. 2.75

(b) Write C program for the following problem, it does not need to think about run-time optimization. 6
(Objective of the question: To check the problem understanding capacity)

One day, one of the students of CSE dept. named Sumon is having a party, and he has invited his friends, **p** of them have arrived already, but some other are runninglate. To occupy his guests, Sumon tried playing some team games with them, but he found that it wasimpossible to divide the **p** guests into any number of equal-sized groups of more than one person.As a result, he had to wait until **q** guest(s) arrived, **q** may be single guest or group of guests arrived at the same time. Finally, summon could make teams of equal sized from the arrived **(p+q)** guests and started his games.

Sample Input

The input will consist of 5 test cases. Each test case will be given as a non-negative integer **(p+q)** and **(p+q)**<=50;

Sample Output

For each test case, output will be an integer **q** that is closest to **(p+q)**..

Sample Input	Corresponding Output
8	1
22	3

University of Rajshahi
Department of Computer Science and Engineering
B.Sc. Engg. Part-I OddSemester, Examination-2017
Course: CSE1121(Computer Programming with C)
Time: 3 Hours Total Marks 52.5

*(Answer any **SIX (06)** questions taking **THREE (03)** from each section)*

Section A

1. (a) If *int i = 5, float f = 7.5, char c = 'a'*, what will be the output of (i) ***i + c*** and (ii) ***i + f***? 1
   (b) If i = 10, f = 18.5 and *int result*, what will be the output of ***result = (i + f) % 4***? 1
   (c) If *float num = 25.5*, what will be the output of***num % 2***and ***((int)num) % 2***? 1
   (d) List the syntax error (if any) of each line of the following code (copy the code on your script, mark the error by placing an underline and then explain that error). 5.75

```
#include<stdio>
main()
{
Intx,y;
scanf("%dd",&x,&y);
switch (x)
  {
   case(x<0): printf("x is positive"); break;
   case(x>0);printf("x is negative");
  }
x=f1(y);
printf("Final value of = %d\n", x);
}

void f1(int y)
{
y=y*y;
return y;
}
```

2. (a) Explain 'the name of array can be considered as pointer'. Give an example how you can pass array to a function. 3.75
   (b) Write a C program that will take N number characters as input and a query character Q. You have to find out how many times Q occurs in that input character array. 5

   Input: The input will have one integer N (100>N>0), then N number of characters and finally a query character Q.
   For example:
   20
   a g b h b r a d f v c d b a f a g b a a
   a

   Output: The output will be the number of how many times Q occurs in that input array.
   For example; the output for the above input will be: 6

3. (a) What do you mean by hierarchy of operation? Determine the hierarchy of operations and evaluate the following expression: 3.75
   $i = 2*3/4+4/4+8-2+5/8.$

(b) Convert the equation into corresponding C statements: $R = \frac{2v + 6.22(c+d)}{g+v}$.

(c) What would be the output of the following program:

```
main()
{
int i=2, j=3,k,l;
   float a,b;
   k=i/j*j; l=j/i*i;
   a=i/j*j; b=j/i*i;
printf("%d%d%f%f", k,l,a,b);
}
```

operation output

4. (a) What are the differences between compiler and interpreter? 2

(b) A student from the dept. of CSE developed the following code to get the expected output as given below. However, unfortunately his code has a single bug; therefore his code did not produce the expected output. 6.75

(i) What is the current output?

(ii) What is that single bug?

(iii) Fix that single bug to get the expected output (you can change/modify only one operator or replace only one variable by another one or change/replace value assigned to only one variable)

```
#include<stdio.h>
#include<conio.h>
inti,j,k,x,y,z=3;
main()
{ for (i=1;i<=z;i++)
 {  x=i;
for(j=1; j<=z ; j++)
{  y=j;
if(x!=y)
        {for (k=65; k<65+z; k++)
printf("%c ",k);
        }
else
        {for (k=64+z; k>=65; k--)
 printf("%c ",k);
        }
}
printf ("\n");
}
getch();
}
```

output type

"!=" changed "==" problem solved.

Expected output:

A B C C B A C B A
C B A A B C C B A
C B A C B A A B C

Section B

5. (a) What is the header file? 1.5

(b) What is the benefitof 'calling a function by reference'? 1.5

(c) What will be the output of the following code? If you think any output (value)to be garbage, mention it as garbage too. Let the addresses of ***a*** and***x***are 22FF44and 22FF34 respectively. 5.75

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

main() {
inta,b,c,d,*x,*y;

    a=15;
    x=&a;

printf("a=%x &a=%x x=%x *x=%x\n",a,&a,x,*x);
printf("&x=%x *(&x)=%x \n",&x,*(&x));
printf("&a=%x *(&a)=%x \n",&a,*(&a));

printf("&(*(&a))=%x *(&(*(&a)))=%x \n", &(*(&a)), *(&(*(&a))));
printf("&(*(&x))=%x *(&(*(&x)))=%x \n", &(*(&x)), *(&(*(&x))));

getch();
}
```

6. (a) What is function? Why is it necessary in programming? 2

(b) What is a function prototype? What do you mean by recursion? State the necessary condition of recursive function. 3

(c) Write a C function to evaluate the series: 3.75

$\sin(x) = x - (x^3/3!) + (x^5/5!) - (x^7/7!).....$

7. (a) What are the differences between 'structure' and 'array'? 2

(b) What is run-time error? Give some examples of run-time error? 2

(c) What will be the output of the following code? If you think any output (value) to be garbage, mention it as garbage too, consider the input for ***roll*** and ***marks***as 101 and 56.25, respectively. 4.75

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

structStudent_struct{
int x;
        float y;
        };

union Student_union{
int x;
        float y;
        };

main()
{
Student_struct s1;
Student_union s2;

printf("Using Stucture \n\n");
printf("Enter the roll of a student\n");
scanf("%d",&s1.x);
printf("\nRoll number is %d and marks is %f",s1.x,s1.y);
```

```
printf("\nEnter the marks of of a student of roll %d \n",s1.x, s1.y);
scanf("%f",&s1.y);
printf("\nRoll number is %d and marks is %f",s1.x,s1.y);

printf("\nUsing Union \n");
printf("Enter the roll of a student\n");
scanf("%d",&s2.x);
printf("\nRoll number is %d and marks is %f",s2.x,s2.y);
printf("\nEnter the marks of of a student of roll %d \n",s2.x, s2.y);
scanf("%f",&s2.y);
printf("\nRoll number is %d and marks is %f",s2.x,s2.y);
}
```

8. (a) Let the contents of a file named "Test.dat" are: 4

```
1 2 3 4 5
2 3 4 5 6
3 4 5 6 7
4 5 6 7 8
5 6 7 8 9
```

Write a program to read those values from the mentioned file and print the biggest value of each row in another file named "Out.dat".

The contents of "Out.dat" look like:

5 6 7 8 9

(b) What will be the output of the following code? 4.75

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

int y(int n);

int main(){
int x;
  x=y(10);
printf("Final Output=%d",x);
getch();
}

int y(int n){
printf("The function is called with the argument %d \n",n);
  if(n==0)
    {
printf("In Terminating Condition= %d \n",n);
        return n;
    }
  else
        { printf("In Recursive function is called with =%d\n", (n-2));
        return n+y(n-2);
        }
printf("CSE %d Times\n",n);
}
```

University of Rajshahi
Department of Computer Science and Engineering
B.Sc. Engineering **Part-I, Odd** Semester Examination **2018(2016-2017)**
Course Code: **CSE-1121** Course Title: **Computer Programming with C**
Time: **03** Hours Full Marks: **52.5**

Section **A**
Answer any **THREE** questions.

1. (a) What is run-time error? Give some examples of run-time error? **2.25**
   (b) If i=4, j=2.5 and int answer, what will be the output of answer=(i+j)%2? **1.50**
   (c) List the syntax error (if any) of each line of the following code. **5.00**

```
struct Books {
  char  title[50];
  char  author[50];
  char  subject[100];
  int   book_id;
};
double printBook( struct Books book ) {
  printf( "Book title : %f\n", book.title);
  printf( "Book author : %s\n", book.author);
  printf( "Book subject : %s\n", book1.subject);
  printf( "Book book_id : %s\n", book.book_id);
}

int main( ) {

  struct Books Book1;
  struct Books Book2;

  strcpy( Book1.title, "C Programming");
  strcpy( Book1--author, "Prata");
  strcpy( Book1.subject, "C Programming Tutorial");
  Book1.book_id = '6495407';

  strcpy( "Telecom Billing", Book2);
  strcpy( Book2.author, "Goodman");
  strcpy( Book2.subject, "Telecom Billing Tutorial");
  Book2.book_id = "6495700";

  printBook( Books Book1 );

  printBook( Book2 );

  return 1;
}
```

2. (a) What will be the output of the following code? **3.75**

```
#include <stdio.h>

int a = 20;
int e;

int main () {
 int a = 10;
 int b = 20;
```

```
int c = 0;
int d=0;

printf ("value of a in main() = % \n", a);
c = sum( a, b);
d = sub( a, b);
printf ("value of c in main() = %d\n", c);
printf ("value of d in main() = %d\n", d);
printf ("value of e in main() = %d\n", e);
return 0;
}

int sum(int a, int b) {
 printf ("value of a in sum() = %d\n", a);
 printf ("value of b in sum() = %d\n", b);
 return a + b;
}

int sub(int a, int b) {
 int c=40;
 printf ("value of a in sub() = %d\n", a);
 printf ("value of b in sub() = %d\n", b);
 return a-b + c;
}
```

→ এখানে e এর মান by default 1 হবে,

(b) What will be the output of the following code? Is there any better or easier way to produce the same output? If any, write the program? **5.00**

```
int main()
{
  int v[4][4];
  int n=3;
 for(int i = 1;i <=n;++i)
 for(int j = 1;j <=n;++j)
  v[i-1][j-1]=(i/j)*(j/i);

  for(int i = 1;i <=n;++i)
  {
    for(int j = 1;j <=n;++j)
 {
   printf("%d",v[i-1][j-1]);
 }
  printf("\n");
   }

return 0;
 }
```

→ * এর জায়গায় সুন্দর (Pointer না)

syntax runtime

3. (a) How do logical errors differ from syntactic and execution errors? **2.00**
   (b) What are the purposes of using continue and break statement? Give example **3.00**
   (c) What is the purpose of using do-while statement? How does it differ from the while statement? Explain with example. **3.75**

4. (a) What will be the output of the following code? **3.00**

```
void operation(int *num1, int *num2)
{
 int tempnum;
```

```
  tempnum = *num1;
  *num1 = *num2;
  *num2 = tempnum;
}
int main( )
{
  int v1 = 11, v2 = 77 ;
  printf("Before operation:");
  printf("\nValue of v1 is: %d", v1);
  printf("\nValue of v2 is: %d", v2);

  operation( &v1, &v2 );

  printf("\nAfter operation:");
  printf("\nValue of v1 is: %d", v1);
  printf("\nValue of v2 is: %d", v2);
}
```

(b) A 4x4 matrix is given in a file named in.txt. **5.75**

in.txt:

10	15	20	25
5	10	20	15
15	25	10	5
20	5	15	10

Read the matrix from the in.txt file, transform all the decimal numbers to its equivalent binary numbers and write into out.txt file.

out.txt:

1010	1111	10100	11001
101	1010	10100	1111
1111	11001	1010	101
10100	101	1111	1010

Section **B**

Answer any **THREE** questions.

5. (a) Some numbers are given as input and their average 214.400000 is calculated using getAverage() function. However, getAverage() is not defined. Your task is to define getAverage() function. **3.00**

```
int main () {
  int balance[5] = {1000, 2, 3, 17, 50};
  double avg;
  avg = getAverage( balance, 5 ) ;
  printf( "Average value is: %f ", avg );
  return 0;
}
```

(b) A programmer developed the following program to have the expected output as given below. However, expected output is not found. **5.75**

(i) What is the current output?

(ii) What is the error?

(iii) Make necessary correction.

Expected Output:

```
c
b
cb
a
ca
```

```
ba
cba

void possibleSubsets(char A[], int N)
  {
     for(int i = 0;i < (1 << N); ++i)
     {
        for(int j = 0;j < N;++j)
          if(i & (1 <<j))
             printf("%c",A[j]);
        printf("\n");
  }
  }

  int main()
  {
     char A[]={'a','b','c'};
     possibleSubsets(A,3);
     return 0;
  }
```

6. (a) What is dynamic memory allocation? **3.00**
   (b) Allocate memory for 100 integer numbers using dynamic memory allocation function in C. Store the numbers into the allocated memory. Your task is to write a program to find the largest number. **5.75**

7. (a) What is the purpose of using a header file? **2.00**
   (b) What is a structure? How does a structure differ from an array? **3.00**
   (c) In the following fragment of code what is the final value of a, b, c. **3.75**
   x=10; b=++x; c=b--; a=--b+a++;

8. (a) What conditions must be satisfied by all the elements of any given array? **2.00**
   (b) A new sorting approach is given. In this approach only one operation (Flip) is available and that is you can exchange two adjacent numbers. If you think a while, you will see that it is always possible to sort a set of numbers in this way. **6.75**
   A set of integers will be given. Now using the above approach you want to sort the numbers in ascending order. You have to find out the minimum number of flips required. Such as to sort '1 2 3'you need no flip operation, however, to sort '2 3 1' you need at least 2 flip operations.

   Input

   The input will start with a positive integer N ($N \leq 1000$). In next few lines there will be N integers. Input will be terminated by 0.

   Output

   For each data set print 'Minimum exchange operations: M' where M is the minimum flip operations required to perform sorting. Use a separate line for each case.

   Sample Input

   3
   1 2 3
   3
   2 3 1
   0

   Sample Output

   Minimum exchange operations : 0
   Minimum exchange operations : 2

University of Rajshahi
Dept. Computer Science and Engineering
University of Rajshahi
Semester Final Examination, B.Sc. Engg. 2019, 1st year, Odd semester
Course ID: CSE 1121 Course Title: : Structural Programming Language
Total Time 3 Hours Total Marks 52.5
(Answer any six questions taking three from each section)

1. (a) Why do we get "segmentation fault" message in C programming? 02
(b) What will be the value of c and d if 03
int a=10; int b=3; float c,d; c=a/b; d=a/2.0;
(c) Can the following program sum all the numbers in the array num[ ]? If not, modify only one variable or a value so that you can sum first ten numbers in the array. 3.75

```
#include<stdio.h>
int main()
{
   int num[11]={5,10,15,20,0,30,35,40,45,50,0};
   int i=0,sum=0;
   while(num[i%5])
   {
      sum=sum+num[i];
      i=i+1;
   }
   printf("%3d",sum);
   return 0;
}
```

2. (a) What is recursive function? What is its limitation? 02
(b) Write a C program for the following problem: 6.75

The student association of the dept. of CSE of Rajshahi University arranged a game in their last picnic. In that game; one student, X from 1st year and another student, Y from 2nd year were asked to pick up balls as many as possible from a basket within 2 minutes. The basket contained many balls having three different colors; red (R), green (G) and blue (B). The winner was decided based on earned points (P), as calculated by the formula; P = (RX-RY)*7 + (GX-GY)*5 + (BX-BY)*3, where RX and RY are the number of red colored balls picked up by X and Y, respectively and so on. The positive value of P indicated that the winner was X; otherwise, the winner was Y.

Input: The input will have two lines; the first line is for X and the second line is for Y. Each line will have three integers separated by spaces; describing the number of red, green and blue balls picked up by the respective student. The inputs will be given in such a way that the value of P will either be positive or negative.

Example:
17 24 30
15 25 25
Output: The output will have a single line that shows the name of the winning year. For example, the output for the above input set will be:
1st year

3. (a) Find out the output of the following program. 4.75

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

void pointer(int *p, int *q, int *r, int *s);

main() {
    int a,b,c,d,*x,*y;
    a=10; b=20; x=&c; y=&d; c=30; d=40;
    printf("Before calling  %d %d %d %d \n",a,b,*x,*y);
    pointer(&c,&d,&a,&b);
    printf("After calling  %d %d %d %d\n",a,b,*x,*y);
}
```

```
void pointer(int *p, int *q, int *r, int *s)
{
   *p=100; *q=200; *r=300; *s=400;
}
```

(b) Find out the output of the following program: 04

```
#include<stdio.h>
void pointer(int *point)
{
   int i;
   for (i=0;i<10;i++)
   {
      printf("%3d",*point);
      point++;
   }
}
int main()
{
   int i;
   int num[10]={0,1,2,3,4,5,6,7,8,9};
   pointer(num);
   printf("\n");
   for(i=0;i<10;i++)
   printf("%3d",num[i]);
   return 0;
}
```

4. (a) Write a program to toggle a bit of a number at nth position using bit-wise operator? 03
   (b) Explain 'the name of array can be considered as pointer'. Give an example how you can pass an array to a function. 03
   (c) Can the following program sum the three numbers? If not, why? 2.75

```
#include<stdio.h>

int main()
{
   int a,b,c,sum=0;
   if(scanf("%d%d%d",&a,&b,&c)==3)
   {
      sum=a+b+c;
   }
   printf("%3d",sum);
   return 0; }
```

Section **B**

Answer any **THREE** questions.

5. (a) Write a program to display A to Z and a to z using ASCII code. 4.75
   (b) Sample input and a program are given. Find out the output of the following program. 04

Sample Input: Happy Coding!

```
#include<stdio.h>
#include<string.h>
void func(char str[])
{
   for (int i=0; str[i]!='\0'; i++)
   {
      if (str[i]>='A' && str[i]<='Z')
         str[i] = str[i] + 'a' - 'A';
      else if (str[i]>='a' && str[i]<='z')
         str[i] = str[i] + 'A' - 'a';
   }
}
```

```
int main()
{
  char str[20];
  gets(str);
  func(str);
  printf("\n%s",str);
  return 0;
}
```

6. (a) What is header file? 02
   (b) 100 small letters are written in a file named input.txt. In each line, 10 letters are written. All the letters are separated by a single space. Determine the frequency of the letters and write into another file named output.txt. 4.75
   (c) What are the differences between compiler and interpreter? 02
7. (a) How can you optimize a program? Give an example. 03
   (b) How can you extend memory allocation during execution of a program? 2.75
   (c) What will be output of the following program? 3.75

```
#include<stdio.h>
#include<conio.h>
int x[5][5]={   {1, 4, 3, 6, 8},
                {2, 9, 0, 5, 7},
                {5, 9, 6, 7, 6},
                {9, 0, 2, 6, 8},
                {3, 6, 0, 1, 7} };

int i,j,k,l, tmp,big,p;

main() {

  for (i=0;i<=4;i++)
  {
    for(j=0; j<=4; j++)
    {
      for(k=j; k<=4; k++)
      {
        for(l=k ; l<=4; l++)
        {
        x[k][l]=x[k][l]+1;
        }
      }
    }
  }

for (i=0;i<=4;i++)
 {
   for(j=0; j<=4; j++)
   {
     printf ("%d ",x[i][j]);
   }
   printf ("\n ");
 }
getch(); }
```

8. (a) What is the difference between an array and a structure? How can you determine the number of bytes allocated for an array and a structure? 2.75
   (b) Google is one of the most famous Internet search engines which hosts and develops a number of Internet based services and products. In the website, an interesting button 'I'm feeling lucky' attracts our eyes. This feature could allow the user skip the search result page and go directly to the first ranked page. Amazing! It saves a lot of time. 06

   The question is, when one types some keywords and presses 'I'm feeling lucky' button, which web page will appear? Google does a lot and comes up with excellent approaches

to deal with it. In this simplified problem, let us just consider that Google assigns every web page an integer-valued relevance.

The most related page will be chosen. If there is a tie, all the pages with the highest relevance are possible to be chosen. Your task is simple, given 10 web pages and their relevance. Just pick out all the possible candidates which will be served to the user when 'I'm feeling lucky'.

Input: The input contains multiple test cases. The number of test cases T is in the first line. For each test case, there are 10 lines, describing the webpage and the relevance. Each line contains a character string without any blank characters denoting the URL of this webpage and an integer Vi denoting the relevance of this web page. The length of the URL is between 1 and 100 inclusively. ($1 < Vi < 100$)

Output: For each test case, output several lines which are the URLs of the web pages which are possible to be chosen. The order of the URLs is the same as the input. Please look at the sample output for further information of output format.

Sample Input
2
www.youtube.com 1
www.google.com 2
www.google.com.hk 3
www.alibaba.com 10
www.taobao.com 5
www.bad.com 10
www.good.com 7
www.fudan.edu.cn 8
www.university.edu.cn 9
acm.university.edu.cn 10
www.youtube.com 1
www.google.com 2
www.google.com.hk 3
www.alibaba.com 11
www.taobao.com 5
www.bad.com 10
www.good.com 7
www.fudan.edu.cn 8
acm.university.edu.cn 9
acm.university.edu.cn 10
Sample Output
Case #1:
www.alibaba.com
www.bad.com
acm.university.edu.cn
Case #2:
www.alibaba.com