Total Marks: 100 **Time: 80 mins**

1. a) Identify different types of tokens in the following program. [10]

```
1  main()
2  {
3      float pi = 3.14;
4      int r = 10;
5      printf("Area = %f\n", pi * r * r);
6      printf("Circumference = %f\n", 2 * pi * r);
7      return 0;
8  }
```

b) The following code is supposed to take three integers as input and output their sum and average value. Find the mistakes of the code if any, and correct them. [10]

```
1  #include<stdio.h>
2  main()
3  {
4      int a, b, c, avg;
5      scanf("%d %d %f", &a, b, &c)
6      s = a + b + c;
7      avg = s / 3;
8      printf("Sum = %d\nAverage = %f\n",avg, s);
9      return 0;
10 }
```

c) Write a program that will take two integer values A and B as input and print floor and ceiling of (A/B). Also print the value after rounding to nearest integer. Here, Floor(x) = largest integer less than or equal to x, Ceiling(x) = smallest integer greater than or equal to x. **You cannot use any if else or any built-in math functions.** [5]

For Example if A = 10, B = 3, output should be:

Floor = 3
Ceiling = 4
After Rounding = 3

2. a) Determine the output of the following program: [10]

```
1  #include<stdio.h>
2  main()
3  {
4      int a, b, c;
5      double s;
6      a = 10;
7      b = a + 3;
8      c = a + b / 3;
9      s = a + b / 3;
10     printf("%d %.3lf\n", c, s);
11     c = a + b / 3.0;
12     s = a + b / 3.0;
13     printf("%d %.3lf\n", c, s);
14     c = (a + b) / 3;
15     s = (a + b) / 3;
16     printf("%d %.3lf\n", c, s);
17     c = (a + b) / 3.0;
18     s = (a + b) / 3.0;
19     printf("%d %.3lf\n", c, s);
20     return 0;
21 }
```

b) Write a program to verify the mathematical theorem $(a + b)^2 = a^2 + 2ab + b^2$. In short, you need to take a, b as input (assume a, b as positive integers) and output the result. For example, if a = 5 and b = 6, output should look like: [10]

```
(5 + 6)^2 = 5^2 + 2x5x6 + 6^2
11^2 = 25 + 60 + 36
121 = 121
LHS = RHS
[Proved]
```

c) Given a 2x3 matrix and another 3x2 matrix as input, write a program to output the resultant matrix which is obtained by multiplying the input matrices. [5]

3. a) Determine the output of the following program for the following inputs:
i) a = 5, b =2 ii) a=2, b = 5 iii) a = 5, b = 1 iv) a = 5, b = 0

```
1  #include<stdio.h>
2  main()
3  {
4      int a, b, c;
5      scanf("%d %d",&a, &b);
6      c = a * b;
7      if ( a > b)
8      {
9          printf("a bigger\n");
10         c = c - a;
11     }
12     else
13     {
14         printf("b bigger\n");
15         c = c + b;
16     }
17     if(a>c && c!=0)printf("Case 1\n");
18     else if(a>=c && b<c)printf("Case 2\n");
19     else if(b==c)printf("Case 3\n");
20     else printf("Case 4\n");
21     return 0;
22 }
```

b) Years that are divisible by 4 and not divisible by 100 with the exception that years that are divisible by 400 are leap year. A Huluculu year is divisible by 15. The Bulukulu year is divisible by 55 provided that it is also a leap year. Given a year as input you will have to write a program which will state what properties the year has. If the year is not leap year or any festival year, then print the line "This is an ordinary year." The order of printing (if present) the properties is leapyear →huluculu →bulukulu. [10]

c) Given three types of swapping methods, write which one is safe to use and the reasons behind your answer. [5]

Method 1	Method 2	Method 3
Temp = A; A = B; B = Temp;	A = A + B; B = A - B; A = A - B;	A = A * B; B = A / B; A = A / B;

4 a) Determine the output of the following program: [10]

```
1  #include<stdio.h>
2  main()
3  {
4      int i, j, k = 1;
5      for(i = 10 ; i>=-1 ; i = i - 1)
6      {
7          printf("Line %d:",k);
8          for(j = 5 ; j<i ; j = j + 1)
9          {
10             printf("%d",j);
11         }
12         printf("\n");
13         k = k + 1;
14     }
15 }
```

Line 1 : 5,6 7 8 9

b) Write a program to take N as input and print the multiplication table for N. N can be at most 999. Use formatted output to align the 'x' and '=' in the output. For example, if N = 15, output should be [10]

```
15 x  1 = 15
15 x  2 = 30
15 x  3 = 45
...
15 x 10 = 150
```

c) Write a problem that face in day to day life which can't be solved using the topics that we have covered so far. Give your reasons. Try to indicate the things that you might need to solve the problem. [5]

Department of Computer Science and Engineering
First Year First Semester B. Sc. Final Examination, 2015
CSE-1102: Programming Fundamentals

Time: 2.5 Hours

Total Marks: 60

(Answer any four (4) of the following questions)

1. a) Write output for the following code segment. (Reminder: %lf prints six digits after decimal point.) 4

```
double a,b;
int x,y;
a = 3.14159625;
x = a;
b = 3.14;
y = b;
printf("%lf %d %lf %lf",a, x, b, y);
```

b) Write output for the following code segment. (Reminder: ASCII of 'a' is 97, 'A' is 65 and '0' is 48) 4

```
char a, b, c;
a = 70;
b = a + 32;
c = a + '0';
printf("%c %c %d", a, b, c);
```

c) Write a small program which takes the area of a circle as input and outputs its radius with 4 digits after the decimal point. Assume π (pi) = 3.1415. See the sample for more clarification. 5

Input	Output
3.1415	Radius = 1.0000
7.068375	Radius = 1.5000

d) Take two positive integers A and B. The value of A and B may reach close to 2^{60}. Let's say C = A * B. You need to find out the number of digits of C in Decimal and Binary. **You cannot use loop or recursion.** 2

Input	Output
3 9	Number of digits in decimal = 2 Number of digits in binary = 5
11 101	Number of digits in decimal = 4 Number of digits in binary = 11

2. a) Write output for the following code segment for the given inputs: 6
i) height = 68, weight = 68 ii) height = 10, weight = 10
iii) height = 62, weight = 72 iv) height = 72, weight = 63

```
int height, weight;
scanf("%d %d", &height, &weight);
if(height == weight && height > 10)
    printf("Perfect\n");
else if(weight - height >= 10)
    printf("Over Weight\n");
else if(weight - height <= -10)
    printf("Under Weight\n");
else
    printf("You are really weird!!!\n");
```

b) Write a program, which will take a character as input and determine whether it falls in any of the following categories. (Reminder: ASCII of 'a' is 97, 'A' is 65 and '0' is 48) 6

i) Digit
ii) Lowercase alphabet
iii) Uppercase alphabet
iv) Others

Some example outputs are shown as follows:

Input	Output
a	Lower Case Alphabet
7	Digit
*	Others

c) In a city there are N bus drivers. Also there are **N** morning bus routes and **N** afternoon bus routes with various lengths. Each driver is assigned one morning route and one evening route. For any driver, if his total route length for a day exceeds **D**, he has to be paid overtime for every hour after the first D hours at a flat R taka / hour. Your task is to assign one morning route and one evening route to each bus driver so that the total overtime amount that the authority has to pay is minimized. For example, if N = 2, D = 20, R = 5, morning route lengths are 10 hours and 15 hours and evening route lengths are 15 hours and 10 hours. Then the minimum overtime you need to pay is 50 Taka. Write a program to solve the problem. 3

3. a) How many times the output "CSEDU" will appear if we run the following program? Explain your answer briefly. 6

```
for(i=0;i<5;i++){
      for(j=2;j<4;j++){
            printf("CSEDU\n");
      }
      for(k=1;k<=9;k=k+2){
            printf("CSEDU\n");
      }
}
```

b) Write a program that will take an integer N as input and print the value of N! (N factorial) as output. 6

c) Lucky strings are bit strings (strings containing only 0 and 1) with no consecutive 0s. A few examples are 0, 1, 11, 01, 111, 011, 101 etc. Write a program, which takes N as input and prints the number of lucky strings with length N. You will be judged based on your programs efficiency. 3

Some example outputs are shown as follows:

Input	Output
1	2
2	3
4	8

4. a) What is the output of the following program: 6

```
int a[5] = {3, 1, 15, 20, 25},i;
a[1] = a[1] + a[2];
a[3] = a[4] - a[2];
for(i=0;i<4;i++)a[i]++;
for(i=0;i<5;i++)printf("a[%d] = %d\n",i,a[i]);
printf("%d\n",a[a[0]]);
```

b) Write a program that takes two square matrices of size N as input and prints the result matrix of their summation. An example output is shown as follows: 6

Input	Output
3 1 2 3 4 5 6 7 8 9 2 3 4 5 6 7 9 8 1	3 5 7 9 11 13 16 16 10

c) You are given two arrays A and B. A contains N integers in increasing order and B contains M integers in decreasing order. Write a program to merge these two arrays in one array C such that the values in C will be in ascending order. You will be judged based on your programs efficiency. 3

Input	Output
3 1 4 10 4 9 8 1 -3	-3 1 1 4 9 10

5. a) What is the difference between character array and string? What is the similarity? Explain with necessary examples. 2

b) Write output for the code below: 6

```
main(){
    int a = 68;
    a++;
    char *ptr;
    ptr = (char *)&a;
    a++;
    printf("%c\n",*ptr);
    (*ptr)++;
    printf("%d\n",a);
    ptr++;
    printf("%d\n",a);
    return 0;
}
```

c) Define a structure named person containing the following fields: 7

Name, Address, Year_of_birth

Now perform the following tasks:

i) Take information of 10 persons as **input**.

ii) Write a function named **getAge** that takes a parameter of struct person type. This function return the age of the person at the year of 2015.

iii) Print **all information** of the **youngest person** among the 10 persons.

Note that, you must use getAge() function to determine the oldest and the youngest person.

a) Write a function which will take a string as parameter and count the number of vowels and consonants in the string. 6

b) Write a program to find out how many leap years are there between A and B. You will take A and B from input. A leap year is a year which is divisible by 4 but not divisible by 100. But if the year is divisible by 400 then it's a leap year. For example, 2004, 2008, 2000 are all leap years. But 1999, 2100 are not leap years. **You need to write a function that will check whether a year is leap year or not.** 6

c) If you are asked to motivate a high school student to do programming, how would you do it? 3

University of Dhaka

Department of Computer Science and Engineering

1st Year 1st Semester B. Sc (Hons.) Lab Exam #01, 2015

CSE – 1111: Computer Programming Lab

Time: 120 mins

Total Marks: 100

1. Take number of a student and print his/her grade point. Use the grading system of University of Dhaka. (80 – A+, 75 – A, 70 – A-, 65 – B+, 60 – B, 55 – B-, 50 – C+, 45 – C, 40 – D, else F) [25]

Input	Output
88	A+
78	A
65	B+
70	A-
39	F

2. Take roll and marks of three students and print the students roll and marks according to their marks in descending order. [25]

Input	Output
1 80 2 90 3 84	2 got 90 3 got 84 1 got 80
3 9 1 0 5 10	5 got 10 3 got 9 1 got 0

3. Take N as input and then take N integers as input. Print the maximum of them and count how many times the maximum number appears among the N integers. [25]

Input	Output
6 1 2 4 2 4 4	Maximum Number = 4. Frequency = 3.
5 1 2 3 2 1	Maximum Number = 3. Frequency = 1.

4. *Take A and B. Find out how many prime numbers are between A and B.* [25]

Input	Output
5 10	2
1 100	25
3 100	24
2 100	25

University of Dhaka
Department of Computer Science and Engineering
First Year First Semester B.Sc. Final Examination, 2015
CSE–1101: Computer Fundamentals

Total Marks: 60 **Time: 2.5 Hours**

[Answer any Four (4) of the following Questions]

1. a) What is a computer? 1
   b) What are the six logical units of a computer? Show the connectivity among these units. 2+2
   c) Mention the properties of the fourth generation computers. 3
   d) Define byte. How many bytes form one megabyte? 2
   e) Write down the ten commandments defined by the computer ethics institute. 5

2. a) Explain working mechanisms of an optical mouse. 5
   b) Differentiate between LCD and LED monitor. 3
   c) Write short notes on resolution and refresh rate. 4
   d) What happens when a key is pressed in the keyboard? 3

3. a) Distinguish between SRAM and DRAM. 4
   b) Describe the general properties of memory devices. 5
   c) Describe the structure of a hard disk and hard disk drive. 5
   d) What is a blue ray disk? 1

4. a) Distinguish between system software and application software. 2
   b) Define operating system. Mention the services provided by the OS. 1+4
   c) Mention the properties of UNIX. 2
   d) Define database and database management system. Why do we need a database? 3
   e) Mention the differences between ASCII and Unicode. 3

5. a) What is meant by telecommunication?
   b) Write down the properties of star topology. 2
   c) Mention the function of a router. What is meant by HTTP? 2
   d) What are the applications of optical fiber?
   e) Define Internet. Discuss about impact of the Internet on society.

6. a) Differentiate among virus, Trojan horse and worm.
   b) What is CAPTCHA? Why it is important?
   c) How antivirus software works?
   d) How can we maintain network security?
   e) What are meant by opcode and operand of a program instruction?

Department of Computer Science and Engineering

First Year First Semester B. Sc. Final Examination, 2013

CSE – 1101: Computer Fundamentals

Total Marks: 60 Time: 2.5 Hours

(Answer any Four (4) of the following Questions)

1. a) Mention the features of the 4th generation computers. 2.5
   b) Mention the function of BIOS. 1.5
   c) Define microprocessor. What are the three basic tasks performed by a microprocessor? 4
   d) What are the advantages of RISC architecture over CISC architecture? 3
   e) How can we measure the speed of a microprocessor? 1.5
   f) With example define opcode and operand of an instruction. 2.5

2. a) Distinguish between primary memory and secondary memory. 2
   b) Write down the differences between SRAM and DRAM. 3.5
   c) DVD stores more data than CD. Why? 2
   d) Describe the structure and working principle of hard disk and hard disk drive. 6
   e) What are the advantages of flash memory stick? 1.5

3. a) Explain working principle of an optical mouse. 3
   b) Describe working principle of ink-jet printers. 4
   c) Mention types of scanner. 1
   d) Explain working principle of a speaker. 3
   e) Mention the advantages of LCD monitor. 3
   f) What is meant by dot pitch of a color monitor? 1

Biplob

4. a) Distinguish between assembly language and high level language. 2
   b) What is the role of an operating system in a computer system? 3.5
   c) Write down the features of Linux. 2
   d) What is the main difference between compiler and interpreter? 1.5
   e) Define ASCII code and Unicode. Mention the advantages of Unicode over ASCII code. 3
   f) Define database management system. Mention the operations performed by a DBMS. 3

5. a) What is meant by telecommunication? 1
   b) Distinguish between ring and star topology. 3.5
   c) Mention the functions of a router. 2
   d) Describe the structure and advantages of optical fiber. 3
   e) Define network protocol. Explain HTTP and FTP. 3.5
   f) Mention frequency ranges for wireless transmission. 2

6. a) Define Internet. Discuss about the impact of the Internet. 6
   b) Mention the value of the Internet penetration rate in Bangladesh. 1
   c) It is said that open source software is more secured. Is it correct? Explain. 3
   d) How can we maintain network security? 3
   e) Distinguish between virus and Trojan horse.. 2

Time: 2.5 Hours

Total Marks: 60

[Answer any Four (4) of the following Questions]

1. a) Classify thermodynamic processes and chemical reaction according to heat change. 3
   b) State the laws of thermodynamics and their implications. 3
   c) Derive an equation to find the effect of temperature on the heat of reaction. 5
   d) One mole of nitrogen is heated from 0 °C to 10 °C under a pressure of 2 atm. Calculate the change in enthalpy assuming the mean specific heat at constant pressure is 0.244 Cal deg^{-1} gm^{-1}. 4

2. a) For a gaseous reaction the heats of reaction at constant pressure and at constant volume may be different, why? 3
   b) The heat of formation of the following compounds from their elements are – PbO = -50,300 Cal; SO_2 = -70,920 Cal; PbS = 19,300 Cal. For the reaction PbS + 1.5 O_2 = PbO + SO_2, Find the heat of reaction at constant volume and constant pressure. 4
   c) Explain the followings: 4
      i) Heat of combustion ii) Heat of dilution
      iii) Hess's law iv) Heat of sublimation
   d) Calculate the heat of formation of CS_2 given that the heats of combustion of CS_2, S and C are -265.10 K Cal; -70.96 K Cal and -94.3 K. Cal respectively. 4

3. a) State law of mass action and explain it with a suitable example. 2
   b) Derive the relationship between Kp and Kc. In what situation Kp will be equal to Kc? 4
   c) Mention the optimum condition for ammonia synthesis. Justify your answer with reference to Le Chatelier Principle. 5
   d) The partial pressures of N_2O_4 and NO_2 in an equilibrium mixture of two gases at 25 °C are 0.69 atm and 0.31 atm respectively. Calculate (a) the Kp and (b) the degree of dissociation of N_2O_4. 4

4. a) Define electrochemical and electrolytic cells with examples and their applications/uses. 4
   b) What is standard electrode potential? How would you determine this? Show the necessary arrangements for this experiment. 4
   c) Define primary and secondary cells with examples. Show the construction and chemical changes occurring in a lead-acetate storage cell. 4
   d) Calculate the potential at 25 °C of the cell $Sn/Sn^{++}(0.1M) \parallel Fe^{++}(0.3)/Fe$. 3

5. a) Explain the following terms: 3
      i) Rate of reaction ii) Order of a reaction
   b) Describe a method to determine the order of a reaction. Under what conditions a bimolecular reaction becomes a monomolecular one? 3+3
   c) For a certain first order reaction $t_{1/2}$ is 100 sec. How long will it take for the reaction to be 75% completed? 2
   d) Show the energy level diagram for exothermic and endothermic reaction. 4

6. a) What is Arrhenious concept of acid-base? 2
   b) Classify the followings as acid or base giving reasons: H^+, $AlCl_3$, Co, NH_3, CaO, Cl_2. 3
   c) What do you mean by P^H scale? Discribe a method for the determination of P^H of a solution. 1+3
   d) How do you make a choice of a suitable indicator for acid-base titration? 4
   e) How does an acid-base indicator work? 2

5. Write a program, that will solve the equation $ax^2+bx+c = 0$. Take a,b,c as input. And show the value(s) of x as output.

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

Example:

Enter a: 2
Enter b: 5
Enter c: -30
x = -5.32, 2.82

6. Take a number n as input and show the multiplication table for n.

Example:

Enter n: 7
Multiplication table for 7

```
**********
7 X 1   =  7
7 X 2   = 14
7 X 3   = 21
...
7 X 10  = 70
**********
```

7. Given an angle (in dgree), convert that to radian and show sin and cos of that angle (up to three decimal places). (use functions from math.h header file)

Example:

Enter angle: 60
Radian: 1.04
sin(60) = 0.866
cos(60) = 0.500

8. W.A.P. to print the digits 0 – 9 using hiphen (-) and vertical bar (|) only.

9. Given x and n as input, show x^n as output. (use functions from math.h header file)

Example:

Enter x = 3
Enter n = 4
3^4 = 81

10. Write a program to calculate first 10 Fibonacci numbers.

Example:

1 1 2 3 5 8 13 21 34

11. Write a program to print out the asterisk (*) in the following format. Use \t (tab).

(a)

```
*
*   *
*   *   *
*   *   *   *
```

(b)

```
        *
    *   *   *
*   *   *   *   *
    *   *   *
        *
```

12. Given radius of a circle, print the area and perimeter of that circle
13. Given three sides of a triangle, print the area of that triangle.

Example:

Enter sides: 8 5 7

Area = 17.32

14. Write a program to calculate Euclidian distance between two Cartesian points.

Example:

Enter 1st point's x co-ordinate: 5

Enter 1st point's y co-ordinate: 10

Enter 2ndt point's x co-ordinate: 18

Enter 2nd point's y co-ordinate: 7

Distance = 13.34

15. Given a time in seconds, convert it to year, month, hour, minute and second.

Example:

Enter second value: 54871963

1 year 9 months 5 days 2 hours 12 minutes 43 seconds

16. Write a program to take as input 6 things as shown below.

Now show a chart showing price for each element as well as total price in a chart form.

Example:

```
Please enter price of rice per KG: 40
How much rice (KG)? 5
Please enter price of sugar per KG: 65
How much sugar (KG)? 7
Please enter price of milk per litre 35
How much milk (Litre)? 15
Price Table:
**************************************************************
Item            Unit Price      Unit Purchased      Total Price
**************************************************************
Rice            40              5                   200 TK
Sugar           65              7                   455 TK
Milk            35              15                  525 TK
**************************************************************
                                Total Price         1180 TK
```

17. Given the values of the variables X,Y and Z write a program to rotate their values such that X has the value of Y, Y has the value of Z and Z has the value of X. [hint: imagine if you have a bottle of coke, a bottle of milk and a bottle of juice, you want milk in the coke bottle, juice in the milk bottle and coke in the juice bottle. How would you solve that? May be using an extra bottle!]

18. Write a program that reads a floating-point number and then displays right-most digit of the integral part of the number. Input: 215.34. output: 5 [hint: type casting]

19. $s = ut + (at^2)/2$. Take as input u, a and t. Calculate s using the formula. Print the value of s. Use double.

20. Print the string "Hello! \ is called back slash and ' is called single quote and " is called double quote and / is called forward slash and % is called percent", with the quotes. [the large spaces are tab characters]

1. Write a program to determine the cost of an automobile insurance premium, based on driver's age(input) and the number of accidents(input) that the driver has had. The basic insurance charge is $500. There is a surcharge of $100 if the driver is under 25 and an additional surcharge for accidents:

# of accidents	Accident Surcharge
1	50
2	125
3	225
4	375
5	575
6 or more	No insurance

Print total insurance charge or "no insurance" according to the given inputs.

2. Prompt the user for a number and print good if the number is greater than 5, between 8 & 10 or greater than 33. Otherwise, print bad.

3. Write a program to determine whether the given integer is divisible by 3, divisible by 5 or divisible by both or divisible by none.

4. Write a program that recommends the number of calories a person should eat each day. Calories are units of energy found in all foods. Base your recommendation on the person's weight and whether the person has an active or inactive lifestyle. If the person is inactive, that person's activity factor is 13. If the person is active, that person's activity factor is 15. Multiply the activity factor by the person's weight to get the recommended number of calories. Start your program by:
   a. having the user enter their weight, as a floating point number
   b. having the user enter whether they have active or sedentary lifestyle, as a character, 'A' for active or 'I' inactive
   c. perform appropriate calculation for the recommended calories for the selected lifestyle
   d. print your results on the screen.

5. The ancient race of Gulamatu is very advanced in their year calculation scheme. They understand what leap year is (A year that is divisible by 4 and not divisible by 100 with the exception that years that are divisible by 400 are also leap year.) and they have also similar festival years. One is the Huluculu festival (happens on years divisible by 15) and the Bulukulu festival (Happens on years divisible by 55 provided that is also a leap year). Given an year you will have to state what properties these years have. If the year is not leap year nor festival year, then print the line 'This is an ordinary year.' The order of printing (if present) the properties is leapyear-->huluculu-->bulukulu.

Sample Input/Output

```
2000
This is leap year.
3600
This is leap year.
This is huluculu festival year.
4515
This is huluculu festival year.
2001
This is an ordinary year.
```

6. Given 2 integers, determine whether 1st inte is equal, less or greater than the second one. Print <, > or = according to their relation.

7. Write a program that reads a date from the user in numeric form. For example, February 17, 2003 would be entered as the three integers 2, 17, and 2003. Your program must then determine if the date is a "valid" date. Use the following information to determine if the date is valid: January, March, May, July, August, October, and December all have 31 days. April, June, September, and November all have 30 days. February has 28 days in a non-leap year and 29 days in a leap year. Print the input date and also print either "valid date" or "invalid date" as output.
8. Check whether the given integer (input will be given such that the value is between 1 and 20) is prime or not. Print prime/not prime according to the test.
9. Check whether given length of 3 sides of a triangle, it is a right angled triangle or not.
10. Design a simple calculator that supports the following operations
    a. Addition
        i. Ask for two numbers to add and show the result after adding them
    b. Subtraction
        i. Ask for two numbers to subtract and show the result after performing subtraction
    c. Multiplication
        i. Ask for two numbers to multiply and show the result after multiplication
    d. Division (similar to above)
    e. Modulus (similar to above)
    f. Power (find a^n, take a and n as input)
    g. Sine (ask for one input (angle))
    h. Cos (similar to sine)
    i. Tan (similar to sine)
    j. Square root (ask for one input and show its square root)

    First ask the user which of the operations they want. If they press a, perform addition, if they press b, perform subtraction and so on.
11. Given marks of four courses, show their grades and GPA for each subject according to the chart below, and also show their c.g.p.a assuming all courses have equal credit.

Mark	Grade	GPA
80 -100	A+	4.00
75 - 79	A	3.75
70 - 74	A-	3.50
65 - 69	B+	3.25
60 - 64	B	3.00
55-59	B-	2.75
50-54	C	2.50
45-49	D	2.25
<44	F	0.00

12. Write a program to show the absolute value of the given integer.
13. Create a program which will allow the user to enter the state of two switches (either 1 (on) or 0 (off)). The program should work out if both switches are on and then output the message 'the light is on'. Otherwise, the program should output the message 'the light is off'.
14. Given 3 integers as input, print which one is the largest among them, also print which one is the smallest among them.
15. http://uva.onlinejudge.org/external/100/1007.html
16. http://uva.onlinejudge.org/external/100/10055.html
17. http://uva.onlinejudge.org/external/111/11172.html
18. http://uva.onlinejudge.org/external/5/579.html
19. http://uva.onlinejudge.org/external/1/190.html
20. http://uva.onlinejudge.org/external/103/1081.html

First Year First Semester B.Sc. Final Examination, 2014
CSE-1102 : Programming Fundamentals

Total Marks: 60 **Time: 2.5 Hours**

[Answer any Four (4) of the following Questions]

1. a) What is comment line? How multi line comments are written in C? 3
   b) Name a built in function in C that can take variable number of parameters. 2
   c) What is the difference between ***keyword*** and ***identifier***? Give necessary examples. 2
   d) Determine whether the following sentences are True/False: 8
      i. C program begins execution from the first function it sees from top.
      ii. C is case insensitive programming language.
      iii. Syntax errors will be detected by the compiler.
      iv. The closing brace of the ***main()*** function is the logical end of a C program.
      v. Once a macro is defined using ***#define*** directive, it cannot be undefined.
      vi. Use of comments will make the program run slower than usual.
      vii. ***do while*** loop is an exit controlled loop.
      viii. We must put a semicolon after defining a macro using ***#define***.

2. a) Write a program that will take two characters as input and print sum of ASCII values of all characters having ASCII values between (inclusive) the given two characters. 5
   b) Find output of the program below for the following sets of inputs: 6

i) 10 20 30 40 ii) -10 -20 -30 -40 iii) -20 -10 -30 -40
iv) 10 10 20 10 v) 10 10 10 20 vi) 10 5 10 10

```
int main()
{
    int max, min, sum, avg;
    scanf("%d%d%d%d",&max,&min,&sum,&avg);
    if( max > min && min < sum )
        printf("A");
    else if(max > min || min < sum)
        if( min == avg )
            printf("B");
        else printf("C");
    else
        if( max < min || min > sum )
            printf("D");
        else
            if (!(avg > sum) || !(sum < min))
                printf("E");
    if (min < sum)
        printf("F");
    puts("");
    return 0;
}
```

   c) Find output of the code below: 4

```
int main()
{
    int i = 0;
    for(i = 0; i < 10; i ++ )
    {
        switch(i)
        {
        case 1:
            puts("Done at 1");
        case 2:
            puts("Done at 2");
        case 3:
            puts("Done at 3");
        case 4:
            puts("Done at 4");
            break;
        }
    }
    printf("Final value of i = %d\n",i);
    return 0;
}
```

3. a) Describe three methods for returning multiple values from a function. 5
b) What is call by value and call by reference? Explain with examples. 5
c) Write a function which will take a string as parameter and count the number of vowels and consonants in the string. 5

4. a) Find output of the code below (Show the array contents): 6

```
int main()
{
    int i = 0, j = 0, a[3][4];
    a[0][0] = 1;
    for(i = 0; i < 3; i ++ )
        for(j = 0; j < 4; j ++ )
        {
            if( i == 0 && j == 0) continue;
            if( i == 0 )
                a[ i ][ j ] = 3 * a[ i ][ j - 1 ];
            else if( j == 0 )
                a[ i ][ j ] = 2 * a[ i - 1 ][ j ];
            else
                a[ i ][ j ] = 2 * a[ i - 1 ][ j ] + 3 * a[ i ][ j-1 ];
        }

    for(i = 0; i < 3; i ++ )
    {
        for(j = 0; j < 4; j ++ )
            printf("%d  ", a[i ][ j ]);
        printf("\n");
    }
}
```

b) Imagine you have declared a 2D integer array having 5 rows and 10 columns. Let assume that an integer takes 4 bytes. Now you have printed address of **a[4][7]** (5th row, 8th column). And that address is 45320. Now can you calculate the base address (address of **a[0][0]**) of that array? 4

c) Write a program to take 3 words as input. Then report one of below (according to the given input): 5

i. Three words are same
ii. 1st word and 2nd word are same.
iii. 2nd word and 3rd word are same.
iv. 1st word and 3rd word are same.
v. All are different.

5. a) What are the advantages of using structures in C? 4
b) Consider the following structure: 6

```
struct student
{
int class, roll, marks;
char name[20];
}x,y;
```

Write a program to swap the values in x and y and check if x and y are equal.

c) What is the output of the following program: 5

```
char str[]={"CSEDU"};
char *ptr=str;
int i;
for(i=0; i<3;i++,ptr++)
{
  Printf("%s\n", ptr);
}
```

6. a) If a = 20 and b = 13 and c = a^b, what will be the value of c? 2
b) How does it differ while opening a file in "w" mode and "a" mode? 2
c) What is token passing operator? How does it work? Explain with an example 2
d) Write a program that will take a double value as input and print the value. You are not allowed to declare any double type variable. You may use pointer and dynamic memory allocation. 4
e) Write a program that will copy all contents from a file ***source.txt*** to another file ***dest.txt***. 5

(Answer any Four (4) of the following Questions)

a) What will be the output of the following code? Give necessary reasons for your output. 4

```
#include <stdio.h>
int main() {
  printf("%d", "abcde"-"abcde");
  return 0;
}
```

b) Fill in the gaps to match with desired output. 4

```
int main() {
      int a = 5;
      char s[] = "Classical Music";
      char *p = (s + 4);
      char c = 'X';
      double d = 150000;
      long int i = 18000000L;
      printf("-----", a); /*Print the value of a */
      printf("-----", s); /*Print the content of s */
      printf("-----", *p); /*print the value pointed by p */
      printf("-----", c); /*Print the value of c */
      printf("-----", p); /*Print the value of p */
      printf("-----", d); /*Print the value of d */
      printf("-----", i); /*Print the value of i */
      return 0;
} /* end main */
```

c) Write down a program in C which will print the following format where number of line is given as input. 4

If $n = 4$, then output will be:

```
ABCDDCBA
ABC  CBA
AB    BA
A      A
```

d) What is the output of following block of code? Explain your answer. 3

```
int main() {
      int arr[] = {6, 12, 18, 24};
      int x = 0;
      x = arr[1] + (arr[1]=2);
      printf("%d", x);
      return 0;
}
```

2 a) Why do we need conditional statement in C Programming? Explain different kinds of conditional statements with example. 5

b) Write a program in C that takes three integers as input that is three sides of a triangle and determine whether it is a right angle triangle or not. Print "Yes" if it is a right angle triangle or "No" otherwise. 5

c) What is the purpose of comments in C Programming? Is the following comment correct? 2

```
/* printf("Hello world"); */
```

d) What is structured programming? Discuss using an example. 2

3. a) Write down syntax of for loop. Write a program using do-while loop that prints the numbers from 1 to 100. 5

b) Explain the following statements with example: 5

i. ***break***
ii. ***continue***

c) Write a program that reads ten numbers entered by the user and reports if any of them match. 5

4. a) What do you understand by infinite loop? When do you need an infinite loop? Discuss with an appropriate example. 3

b) Write the differences between 4

i. ***unsigned int*** and ***int***
ii. ***while loop*** and ***do-while loop***

c) Define a structure data type called **date** containing 3 members: integer day, integer month, and integer year. Develop a interactive modular program to perform the following tasks: 8

i. Read data into structure by a function.
ii. Validate the date entered by another function.
iii. Print the date in the format: **June 9, 2012**

5. a) What is function? Write a C program that will print the second maximum of an array of 100 integers. 1+4

b) Explain call by value and call by reference in C using examples. 4

c) Suppose you have a text file 'a.txt'. Now write a C code that will read the file and output the number of occurrences of the word "CSEDU" in the text file. 6

a) What is an Array? Explain with respect to C programming. Declare a two dimensional array and initialize its values with 1. 1+2

b) What do you mean by bitwise operation? Explain with example. 3

c) Write a program that clear x^{th} bit of an integer n. 4

d) What is recursion? Write a recursive function that check a string is a palindrome or not. 1+4

University of Dhaka

1st Year 1st Semester B.Sc. – 2012

Subject: Programming Fundamental **Paper: CSE – 1102**

Time: 60 mins **Marks: 30**

1.	Write a program that inputs a string, then displays it backward on the screen.	5
2.	What is an ARRAY – explain with respect to C programming language. Declare a two dimensional array and initialize its values with 1.	5
3.	Write a function that takes a string and return 1 if the string is palindrome or return 0 otherwise. And also draw the flowchart of the function.	5
4.	Suppose you are an instructor of programming fundamental. One of your students writes a code arbitrarily and the code is given below. But his work was not meeting your requirement. As a result he was failed to generate expected output. Finally he ask for your help. So your task is to behave like a compiler, and generate the output of the following code:	5

```
#include<stdio.h>
int  main(){
     int a[6] = {5, 2, 4, 6, 1, 3};
      int n = 6;
     int i,j,key;
     for(j=1; j<n; j++){
        {   key = a[j];
            i = j-1;
            while(i>-1 && a[i]>key){
                  a[i+1] = a[i]; i--;
            }
            a[i+1]=key;
     }
     for(i=0; i<n; i++)
        .   printf("%d ", a[i]);
}
```

5.	Write a program for number conversion. That is you will be given a number x in decimal. You have to convert the given number into binary.	5

6.	What is structure? Write down syntax of structure.
	What is the size of following structure?
	`struct test {`
	`  int a;`
	`  char st[5];`
	`  double x;`
	`};`
		5

4bytes
1bytes
8bytes
13 bytes.

Univ

1st Year 1st

Subject: Structured Progr

Time: 45 mins

1. The following program have a run
```
#include <stdio.h>

int main()
{
      int x, y, z;
      scanf("%d %d", &x,
      z = x / y;
      printf("%d\n", z);
      return 0;
}
```
Correct the program with appropri

2. Which of the following are not id
   a) 3id
   b) __yes
   c) o_no_o_no
   d) 00_go
   e) 1_i_am
   f) One_i_aren't
   g) Me_to-2
   h) Sta*it
   i) xYshouldI
   j) int

a-2

3. What is the output of the followin
```
#include <stdio.h>
#include <math.h>


int main()
{
      int x, y, z;
      double a, b, c;
```

University of Dhaka

1st Year 1st Semester B. Sc. – 2012

Subject: Structured Programming **Paper: CSE-1102**

Time: 60 mins **Marks: 40**

Answer any Five (5) of the following Six (6) questions

1.	Write a program in C that takes three integer numbers from user and display product of these numbers.	8

2.	What does the following program prints?
	`#include <stdio.h>`
	`int main()`
	`{`
	`  int x = 1, total = 0, y;`
	`  while ( x <= 10 ) {`
	`  y = x * x;`
	`  printf( "%d\n", y );`
	`  total += y;`
	`  ++x;`
	`  }`
	`  printf("Total is %d\n", total);`
	`  return 0;`
	`}`
		8

3.	Write the syntax of if-else-if and do-while loop.	8
4.	Write a program in C that takes list of n items. Determine whether the list is increasing order or not? Print "Yes" if the list in increasing orders, "No" otherwise.	8
5.	a) What is variable? Describe with diagram typical C program development environment.	8
6.	Write a program in C that prints all even numbers between 1 and 100. Give its flowchart.	8

Set B

1. Describe working principle of an ink-jet printer. 3.5
2. Distinguish between EPROM and EEPROM. 1.5
3. Define interpreter. 1
4. How digital data is converted into sound? Explain. 2.5
5. Mention features of Linux. 1
6. Why do we use BIOS in a computer? 1
7. Mention features of a computer. 1.5
8. Define virtual memory. 1
9. How can we define hardware? 1
10. What is the main function of an OS? 1

Set B (1st year 2012, CT-3, CSE 1101, Time: 50 minutes, Marks: 15)

1. Define mouse. 1
2. Describe the structure of a track-ball mouse. 3
3. Write down the benefits of optical mice over track-ball mice. 2
4. Write a short note about digital camera. 2
5. Write down the features of Pentium III. 1.5
6. Describe the components of CPU. 2.5
7. Define op-code of an instruction of a microprocessor. 1
8. Write down the features of Celeron. 2

Set A (1st year 2012, CT-3, CSE 1101, Time: 50 minutes, Marks: 15)

1. Mention the groups of keys of a keyboard. 1.5
2. Write down the names of keyboard layouts. 1.5
3. What happens when a key is pressed in a keyboard? 2.5
4. Describe arrangement of keys in a keyboard. 2
5. Write down the features of Pentium IV. 1.5
6. Mention the main functions of a CPU 2
7. Define instruction set of a microprocessor. 1
8. Distinguish between RISC and CISC. 3

Set B (1st year 2012, CT-2, CSE 1101, Time: 50 minutes, Marks: 15)

1. Distinguish between router and gateway. 1.5
2. Write a short note about coaxial cable. 2.5
3. Describe structure and data flow technique of a Star topology 3
4. What is the main function of session layer of OSI reference model? 1
5. ~~Define network backbone.~~ Modem segment of a network. 1
6. How viruses are spreading from computer to computer? 2
7. Distinguish between wired and wireless transmission. 3
8. Define worm. 1

Set C (1st year 2014, CT-1, CSE 1101, Time: 1 hour, Marks: 24)

1. Write down the properties of SRAM. 3
2. Describe the six logical units of a computer. 6
3. Mention the features of 5th generation computers. 2
4. Mention the function of a NIC card. 2
5. Mention name of four pointing input devices. 2
6. Explain working principle of a flatbed scanner. 4
7. Distinguish between CRT monitor and LCD monitors. 5
8. What happens when a keyboard of a key is pressed? 3

Set D (1st year 2014, CT-1, CSE 1101, Time: 1 hour, Marks: 24)

1. Explain working principle of an optical mouse. 4
2. Mention name of four image input devices. 2
3. Distinguish between ink-jet printer and laser printer. 5
4. Explain working principle of a speaker. 3
5. Write down the properties of DRAM. 3
6. Show computer organization with direction of Buses. 2
7. Mention the features of 4th generation computers. 3
8. Mention the function of BIOS. 2

Set B

Define a structure named **MovieStar** which will have the following elements: *Name (string), Rating(float), TotalFans(int).* Declare a structure array of **MovieStar** for 5 movie stars. Now take N user reviews as input. Each review will consist of a Movie star name and his rating by a new fan. Now adjust each Movie Star's rating according to the reviews and show the results. Rating of a movie star is the average rating given by fans those who rated him.

Set C (1st year 2013, CT-2, CSE 1101, Time: 1 hour, Marks: 15)

1. Define Extranet.
2. Write down the features of Linux
3. Mention the main difference between assembly language and machine language
4. How data can be read from an optical disk.
5. Distinguish between hard disc and flash memory.
6. Write a short on the applications of internet.
7. Mention the features of high level languages.

Set B (1st year 2013, CT-2, CSE 1101, Time: 1 hour, Marks: 15)

1. Define Intranet.
2. Write down the features of Windows NT.
3. Mention the main difference between system software and application software
4. Describe the structure of a hard disk drive.
5. Distinguish between CD and DVD.
6. Briefly describe the impact of internet.
7. What are meant by multitasking and multi-processor support of OS?

Set A (1st year 2013, CT-2, CSE 1101, Time: 1 hour, Marks: 15)

1. Define Internet.
2. Write down the features of Unix.
3. Mention the main difference between compiler and interpreter
4. Describe the structure of a hard disk
5. Distinguish between DVD and flash memory.
6. Write a short on E-business.
7. Mention the utility programs.

Set A (1st year 2013, CT-3, CSE 1101, Time: 1 hour, Marks: 15)

1. What is meant by data? 1
2. Define EBCDIC code. 1.5
3. Define database. Mention the functions performed by a DBMS. 2
4. Mention the virus spreading methods. 2
5. Mention the benefits of open source software security. 2
6. Define white hat hacking. 1
7. Mention the features of RISC. 2.5
8. With example define opcode of an instruction. 1
9. Describe the components of a microprocessor. 2

Set B (1st year 2013, CT-3, CSE 1101, Time: 1 hour, Marks: 15)

1. What is meant by information? 1
2. Define ASCII code. 1.5
3. Define DBMS. Mention the components of a database. 2
4. How viruses are borne? 2
5. Mention the drawbacks of open source software security. 2
6. Define black hat hacking. 1
7. Mention the features of Dual-core processors. 2.5
8. With example define operand of an instruction. 1
9. What are the three basic tasks performed by a microprocessor? 2

Set C (1st year 2013, CT-3, CSE 1101, Time: 1 hour, Marks: 15)

1. Define white hat hacking. 1
2. Mention the features of RISC. 2.5
3. With example define opcode of an instruction. 1
4. Describe the components of a microprocessor. 2
5. What is meant by data? 1
6. Define EBCDIC code. 1.5
7. Define database. Mention the functions performed by a DBMS. 2
8. Mention the virus spreading methods. 2
9. Mention the benefits of open source software security.

Set D (1st year 2013, CT-3, CSE 1101, Time: 1 hour, Marks: 15)

1. Define black hat hacking. 1
2. Mention the features of Dual-core processors. 2.5
3. With example define operand of an instruction. 1
4. What are the three basic tasks performed by a microprocessor? 2
5. What is meant by information? 1
6. Define ASCII code. 1.5
7. Define DBMS. Mention the components of a database. 2
8. How viruses are borne? 2
9. Mention the drawbacks of open source software security. 2

University of Dhaka
Department of Computer Science and Engineering
First Year First Semester B.Sc. Final Examination, 2012
CSE-1101: Computer Fundamentals

Total Marks: 60 **Time: 2.5 Hours**

(Answer any Four (4) of the following Questions)

1. a) Define computer. Mention the features of a computer. 3
   b) What are the six logical units of a computer? Show the connectivity among these units. 3
   c) Describe the computer generations. 4.5
   d) What is Internet? Describe the evolution of the Internet and its different services. 4.5

2. a) Explain the working principle of a laser printer. 4.5
   b) Distinguish between CRT monitor and LCD monitor. 3.5
   c) What happens when a key of a keyboard is pressed? 2
   d) Mention the advantages of an optical mouse over a track-ball mouse. 2
   e) Explain the working principle of a flatbed scanner. 3

3. a) Define hardware and software. Distinguish between system software and application software. 4
   b) What is a program? Mention the characteristics of high level languages. 3
   c) Write down the features of Unix. 2
   d) Define computer virus. How viruses are spreading? How can we protect our computers from viruses? 6

4. a) Distinguish between router and gateway. 2
   b) Describe the frame transmission technique of a ring topology. 4
   c) Distinguish between wired and wireless transmission. 3
   d) What tasks can be done by NIC? What is a modem? 3
   e) Compare performances of optical fiber, twisted pair cable and coaxial cables. 3

5. a) Describe the general properties of computer memory. 3
   b) Distinguish between i) EPROM and EEPROM ii) SRAM and DRAM. 4
   c) Describe the structure of hard disk. 4.5
   d) Compute the storage capacity of a double sided disk which has 200 tracks/side, 160 sectors/track and can store 2 KB in each sector. 1.5
   e) How can data be read from a CD-ROM? 2

6. a) Using flow diagram explain the functions of CPU. 4
   b) Distinguish between RISC and CISC. 4
   c) Compare Unicode with ASCII code. 2
   d) What is a database? What are the components of a database? 2
   e) Define database management system. Which operations can be performed by using a DBMS? 3

University of Dhaka

1st Year 1st Semester B. Sc. – 2012

Subject: Structured Programming **Paper: CSE-1102**

Time: 60 mins **Marks: 40**

Answer any Five (5) of the following Six (6) questions

1.	Write a program in C that takes three integer numbers from user and display product of these numbers.	8

2.	What does the following program prints?
	`#include <stdio.h>`
	`int main()`
	`{`
	`  int x = 1, total = 0, y;`
	`  while ( x <= 10 ) {`
	`  y = x * x;`
	`  printf( "%d\n", y );`
	`  total += y;`
	`  ++x;`
	`  }`
	`  printf("Total is %d\n", total);`
	`  return 0;`
	`}`
		8

3.	Write the syntax of if-else-if and do-while loop.	8
4.	Write a program in C that takes list of n items. Determine whether the list is increasing order or not? Print "Yes" if the list in increasing orders, "No" otherwise.	8
5.	a) What is variable? Describe with diagram typical C program development environment.	8
6.	Write a program in C that prints all even numbers between 1 and 100. Give its flowchart.	8

University of Dhaka

1st Year 1st Semester B.Sc. – 2012

Subject: Programming Fundamental Paper: CSE – 1102

Time: 60 mins Marks: 30

1.	Write a program that inputs a string, then displays it backward on the screen.	5
2.	What is an ARRAY – explain with respect to C programming language. Declare a two dimensional array and initialize its values with 1.	5
3.	Write a function that takes a string and return 1 if the string is palindrome or return 0 otherwise. And also draw the flowchart of the function.	5
4.	Suppose you are an instructor of programming fundamental. One of your students writes a code arbitrarily and the code is given below. But his work was not meeting your requirement. As a result he was failed to generate expected output. Finally he ask for your help. So your task is to behave like a compiler, and generate the output of the following code:	5

```
#include<stdio.h>
int  main(){
     int a[6] = {5, 2, 4, 6, 1, 3};
      int n = 6;
     int i,j,key;
     for(j=1; j<n; j++){
        key = a[j];
        i = j-1;
        while(i>-1 && a[i]>key){
             a[i+1] = a[i]; i--;
        }
        a[i+1]=key;
     }
     for(i=0; i<n; i++)
        printf("%d ", a[i]);
}
```

5.	Write a program for number conversion. That is you will be given a number x in decimal. You have to convert the given number into binary.	5

6.	What is structure? Write down syntax of structure.
	What is the size of following structure?
	`struct test {`
	`int a;`
	`char st[5];`
	`double x;`
		5

Subject: Structured Progr

Time: 45 mins

1. The following program have a run
```
#include <stdio.h>

int main()
{
        int x, y, z;
        scanf("%d %d", &x,
        z = x / y;
        printf("%d\n", z);
        return 0;
}
```
Correct the program with appropri

2. Which of the following are not id
   a) 3id
   b) __yes
   c) o_no_o_no
   d) 00_go
   e) 1_i_am
   f) One_i_aren't
   g) Me_to-2
   h) Star*it
   i) xYshouldI
   j) int

a-zA-Z or _

3. What is the output of the followi
```
#include <stdio.h>
#include <math.h>

int main()
{
        int x, y, z;
        double a, b, c;
```

1. Describe working principle of an ink-jet printer.	3.5
2. Distinguish between EPROM and EEPROM.	1.5
3. Define interpreter.	1
4. How digital data is converted into sound? Explain.	2.5
5. Mention features of Linux.	1
6. Why do we use BIOS in a computer?	1
7. Mention features of a computer.	1.5
8. Define virtual memory.	1
9. How can we define hardware?	1
10. What is the main function of an OS?	1

Set B (1st year 2012, CT-3, CSE 1101, Time: 50 minutes, Marks: 15)

1. Define mouse.	1
2. Describe the structure of a track-ball mouse.	3
3. Write down the benefits of optical mice over track-ball mice.	2
4. Write a short note about digital camera.	2
5. Write down the features of Pentium III.	1.5
6. Describe the components of CPU.	2.5
7. Define op-code of an instruction of a microprocessor.	1
8. Write down the features of Celeron.	2

Set A (1st year 2012, CT-3, CSE 1101, Time: 50 minutes, Marks: 15)

1. Mention the groups of keys of a keyboard.	1.5
2. Write down the names of keyboard layouts.	1.5
3. What happens when a key is pressed in a keyboard?	2.5
4. Describe arrangement of keys in a keyboard.	2
5. Write down the features of Pentium IV.	1.5
6. Mention the main functions of a CPU	2
7. Define instruction set of a microprocessor.	1
8. Distinguish between RISC and CISC.	3

Set B (1st year 2012, CT-2, CSE 1101, Time: 50 minutes, Marks: 15)

1. Distinguish between router and gateway.	1.5
2. Write a short note about coaxial cable.	2.5
3. Describe structure and data flow technique of a Star topology	3
4. What is the main function of session layer of OSI reference model?	1
5. Define network backbone. Modem segment of a network.	1
6. How viruses are spreading from computer to computer?	2
7. Distinguish between wired and wireless transmission.	3
8. Define worm.	1

CSE – 1101: Computer Fundamentals

Total Marks: 60 **Time: 2.5 Hours**

(Answer any Four (4) of the following Questions)

1. a) Mention the features of the 4th generation computers. 2.5
   b) Mention the function of BIOS. 1.5
   c) Define microprocessor. What are the three basic tasks performed by a microprocessor? 4
   d) What are the advantages of RISC architecture over CISC architecture? 3
   e) How can we measure the speed of a microprocessor? 1.5
   f) With example define opcode and operand of an instruction. 2.5

2. a) Distinguish between primary memory and secondary memory. 2
   b) Write down the differences between SRAM and DRAM. 3.5
   c) DVD stores more data than CD. Why? 2
   d) Describe the structure and working principle of hard disk and hard disk drive. 6
   e) What are the advantages of flash memory stick? 1.5

3. a) Explain working principle of an optical mouse. 3
   b) Describe working principle of ink-jet printers. 4
   c) Mention types of scanner. 1
   d) Explain working principle of a speaker. 3
   e) Mention the advantages of LCD monitor. 3
   f) What is meant by dot pitch of a color monitor? 1

4. a) Distinguish between assembly language and high level language. 2
   b) What is the role of an operating system in a computer system? 3.5
   c) Write down the features of Linux. 2
   d) What is the main difference between compiler and interpreter? 1.5
   e) Define ASCII code and Unicode. Mention the advantages of Unicode over ASCII code. 3
   f) Define database management system. Mention the operations performed by a DBMS. 3

5. a) What is meant by telecommunication? 1
   b) Distinguish between ring and star topology. 3.5
   c) Mention the functions of a router. 2
   d) Describe the structure and advantages of optical fiber. 3
   e) Define network protocol. Explain HTTP and FTP. 3.5
   f) Mention frequency ranges for wireless transmission. 2

6. a) Define Internet. Discuss about the impact of the Internet. 6
   b) Mention the value of the Internet penetration rate in Bangladesh. 1
   c) It is said that open source software is more secured. Is it correct? Explain. 3
   d) How can we maintain network security? 3
   e) Distinguish between virus and Trojan horse. 2

Department of Computer Science and Engineering
First Year First Semester B. Sc Final Examination, 2013
CSE – 1102: Programming Fundamentals

Total Marks: 60 **Time: 2.5 Hours**

(Answer any Four (4) of the following Questions)

1. a) What do you understand by the term "data type"? Show the simple data types used in "C" language in a tree structure. 4

   b) Suppose, you need to use four data for a circle: (i) name (alphanumeric – maximum of 10 characters), (ii) the radius, (iii) the circumference, and (iv) the area. Then, 2+4

   A. What types of data would you use for these?

   B. Write down the C programming variable definitions for these data.

   c) Write a program in C language that will compute and print the value of pi (π) from a circle as represented in question 1(b). In case of printing the value of π, print 6 digits after the decimal point. 5

2. a) The two basic complex data structures in C are: (i) Array and (ii) Structure. What are their relative advantages and disadvantages? When would you choose arrays and when structures? Why? 6

   b) Suppose, you need to operate on 30 student records where each student record consists of the followings: 6

   i) Roll number, ii) name (of max length 30 characters), iii) date of birth, and iv) age. Write down the data definitions that you will use in programming.

   c) For the data definitions used in question 2(b), write the **scanf** and **printf** statements to take input and show values, respectively. 3

3. a) In C language, what is the difference between "NULL" and "void"? Explain with examples. 3

   b) What would be the value of the variable **val** after execution of the following statement blocks? Briefly describe how the value is assigned. 3+5

   i)
```
float ifConfusing;
int val;
ifConfusing = 0.19839127;
val = ifConfusing <= 0.19836 ? ifConfusing :
(ifConfusing > 22/7 ? 22/7 - 1 : 22/7 - 2);
```

   ii)
```
unsigned char mayConfuse;
unsigned char val;
mayConfuse = 255;
if ( ++mayConfuse )
    val = mayConfuse & 2;
else
    val = (mayConfuse | 2 ) >> 1;
```

   c) Suppose, you have a function that computes the Ecludian distance of a point (x, y, z) from the origin (0,0,0) and its prototype is: 4

```
double eDistance(float *x, float *y, float *z);
```

   Write the function body.

4. a) What is the differences between while and do-while loop? 3

b) Write a program using conditional operators to determine whether a year entered through the keyboard is a leapyear or not. 4

c) Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another. 4

d) Write a program to print all prime numbers from 1 to 300. 4

5. a) Write the syntax of if-else-if with example. 3

b) Given three points (x1, y1), (x2, y2) and (x3, y3), write a program to check if all the three points fall on one straight line. 5

c) What is Swapping? How can you swap two numbers *with* and ***without*** temporary variable? Explain with proper example. 4

d) What are the differences between i++ and ++i. 3

6. a) What are the modes for opening a file in C using **fopen**? 3

b) Suppose, you have to store 100 points in *id*: (*x*, *y*) format in a file, where *id*, *x* and *y* are three parameters of a point indicating the identification number, *x* location and *y* location of the point, respectively. Write a program that will generate the points and store in the file. 7

c) Write a program that will open the file generated by the program in question 6(b) and show the content of the file in the screen. 5

Total Marks: 60 **Time: 2.5 Hours**

(Answer any Four (4) of the following Questions)

1. a) What will be the output of the following code? Give necessary reasons for your output. 4

```
#include <stdio.h>
int main() {
  printf("%d", "abcde"-"abcde");
  return 0;
}
```

b) Fill in the gaps to match with desired output. 4

```
int main() {
      int a = 5;
      char s[] = "Classical Music";
      char *p = (s + 4);
      char c = 'X';
      double d = 150000;
      long int i = 18000000L;
      printf("-----", a); /*Print the value of a.*/
      printf("-----", s); /*Print the content of s */
      printf("-----", p); /*print the value pointed by p */
      printf("-----", c); /*Print the value of c */
      printf("-----", p); /*Print the value of p */
      printf("-----", d); /*Print the value of d */
      printf("-----", i); /*Print the value of i */
      return 0;
} /* end main */
```

c) Write down a program in C which will print the following format where number of line is given as input. 4
If n = 4, then output will be:

```
ABCDDCBA
ABC  CBA
AB    BA
A      A
```

d) What is the output of following block of code? Explain your answer. 3

```
int main() {
      int arr[] = {6, 12, 18, 24};
      int x = 0;
      x = arr[1] + (arr[1]=2);
      printf("%d", x);
      return 0;
}
```

2. a) Why do we need conditional statement in C Programming? Explain different kinds of conditional statements with example. 5

b) Write a program in C that takes three integers as input that is three sides of a triangle and determine whether it is a right angle triangle or not. Print "Yes" if it is a right angle triangle or "No" otherwise. 5

c) What is the purpose of comments in C Programming? Is the following comment correct? 3

```
/* printf("Hello world"); */
```

d) What is structured programming? Discuss using an example. 2

3. a) Write down syntax of for loop. Write a program using do-while loop that prints the numbers from 1 to 100.

b) Explain the following statements with example:

i. ***break***
ii. ***continue***

c) Write a program that reads ten numbers entered by the user and reports if any of them match. 5

4. a) What do you understand by infinite loop? When do you need an infinite loop? Discuss with an appropriate example. 3

b) Write the differences between 4

i. ***unsigned int*** and *int*
ii. ***while loop*** and *do-while loop*

c) Define a structure data type called **date**, containing 3 members: integer day, integer month, and integer year. Develop a interactive modular program to perform the following tasks: 8

i. Read data into structure by a function.
ii. Validate the date entered by another function.
iii. Print the date in the format: **June 9, 2012**

5. a) What is function? Write a C program that will print the second maximum of an array of 100 integers. 1+4

b) Explain call by value and call by reference in C using examples. 4

c) Suppose you have a text file 'a.txt'. Now write a C code that will read the file and output the number of occurrences of the word "CSEDU" in the text file. 6

6. a) What is an Array? Explain with respect to C programming. Declare a two dimensional array and initialize its values with 1. 1+2

b) What do you mean by bitwise operation? Explain with example. 3

c) Write a program that clear x^{th} bit of an integer n. 4

d) What is recursion? Write a recursive function that check a string is a palindrome or not. 1+4

CSE 1102 : Programming Fundamentals

Incourse Examination I (16 March 2011, 9AM)

Duration: 50 minutes | Set - A | Total: 30

1. What will be the output of the following code snippets: 2+2+2+4=10

a)
```
int v1, v2, v3;
v1 = 5;
v2 = 3;
v3 = v1++ + v2--;
printf("%d, %d, %d\n",v1, v2, v3);
v2 += --v3 + v1++;
printf("%d, %d, %d\n",v1, v2, v3);
v1 *= v2 * v3;
printf("%d, %d, %d\n",v1, v2, v3);
```

b)
```
int x=2, y=17, z=11, result=5;
result -= 2 * z % 13 + y / 3 + x;
printf( "%d\n", result );
```

c)
```
int m = 19;
int n = -37;
int p = 4;
switch(3*m+p)
{
      case 60: m = 88; break;
      case 61: m = 0;
      case 100: n = -40;
      case 48: p = 48;
      case 20: printf("case is 20\n");
               break;
      default: printf("none\n"); break;
}
printf("%d, %d, %d\n",m,n,p);
```

d)
```
int i=0, j;
while (i < 3)
{
      j = 4;
      while(j >= 0)
      {
            if (j == 2)
            {
                  i++; j--;
                  continue;
            }
            if (i == 2)
            {
                  j -= 2;
                  break;
            }
            printf( "%d %d\n", i, j );
            --j;
      }
      i++;
      printf( "%d %d\n", i, j );
}
```

2. Following are some code snippets that may or may not contain any error(s). If you find any write down the appropriate line number and explain the error clearly. 10

```
1 #include<stdio.h>
2
3 int main()
4 {
5       int y1, x1, y2, x2
6       scanf("%d%d%d%d",x1,x2,y1,y2);
7       z = (x1 + y1)%(x2 + y2);
8       if(x1 > x2 & y1 < x2)
9       {
10            while(1 = 45);
11            {
12                  +i+;
13            }
14      }
15      else;
16      {
17            printf("x1 is less than x2);
18      }
19      else (x1==x2)
20      {
21            printf("They are equal\n")
22      }
23
24      return 0;
25 }
```

3. Write a complete C program to accomplish the following tasks: 10

Calculate and print the sum of the following series, where x and n are given as a real number and an integer input respectively. You have to print the result using exactly 4 decimal digits after the decimal point.

$x^2 \quad x^3 \quad x^4 \quad x^n$

(c) What is structured programming? Discuss using an example C program. 3

(d) Write a C program that will take a floating point positive number as input and prints that number as rounded to the nearest integer. To accomplish this you should not use any trick of format specifiers of `printf()` function [e.g., `printf("%.0f",val);`]. Please look at the sample input and output below:

Sample Input	Sample output
5.67	6
5.47	5

4. (a) Suppose you have declared a two dimensional array using the declaration statement `double M[514][97]`. If the memory address of the first byte of the declared array is 4000, then calculate the memory addresses of these elements: (i) M[50][50], (ii) M[513][96] and (iii) M[4][1]. *Consider Row-Major ordering in memory allocation of two dimensional arrays.* 3

(b) What do you understand by infinite loop? When do you need an infinite loop? Discuss with an appropriate example. 2

(c) Write the differences between 3

i. *unsigned int* and *int*

ii. An array of characters and a string

(d) Write a C program that takes two string inputs and replaces all occurrences of the letter X in the first string with the second string. 4

(e) Write a C program that prints the second maximum of an array of 100 integers. 3

5. (a) Explain *call by value* and *call by reference* in C using examples. 3

(b) i. What do you understand by a recursive function? 1

ii. What are the important properties that a recursive function must have? 2

iii. Write a recursive function in C that tests if its two integer arguments are relatively prime (x and y are relatively prime if they have no common divisor except 1). Use additional parameters for your function if required. 4

(c) What do you understand by prototypes of function? Why is it necessary? 2

(d) Write a C function that accepts a $N \times 5$ two-dimensional floating-point array and its row size N as the second argument and returns the average of the values of the array. 3

6. (a) What are the differences between user-defined data types and built-in data types? In C, how you define new data types and use them? Explain with appropriate examples. 4

(b) Distinguish between a macro and a function. Define a macro and a function to compute minimum of two arguments. 4

(c) What do you understand by storage classes of variables (static, auto, extern, register)? Describe each of them using appropriate examples. 4

(d) Describe how you will allocate an N-element float array dynamically, then take N floating point numbers from the user and compute and print standard deviation of the given numbers. What additional benefits are provided by the dynamic memory allocation as compared to static memory allocation? [For your information: 3

$$\text{Standard deviation of } N \text{ numbers} = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \bar{x})^2}$$

where x_i= i^{th} number, $\bar{x}$=average of the N numbers.]

Total Marks: 60 Time: 2.5 Hours

[Answer any four (4) of the following Questions.]

1. (a) Using Compiler perspective, write short notes on the following topics: $2 \times 3 = 6$
   i. Preprocessor
   ii. Object code
   iii. Loader

   (b) What is the output of the following C code snippet. 5

```
1 int x, y, z;
2 x = 2; y = 1; z = 0;
3 x = x && y || z; printf("%d\n",x);
4 printf("%d\n", x || !y && z);
5 x = y = 1;
6 z = x ++ - 1; printf("%d\t%d\n",x,z);
7 z += - x ++ + ++ y; printf("%d\t%d\t%d\n",x,z,y);
8 x = 3 * 4 % 5 / - 2 * 4 + 12; printf("%d\n",x);
```

   (c) Write a program that takes an integer input n. It then prints n lines. The first line shows numbers 1 through n, separated by spaces (i.e. 1 2 3 ... n). The second line shows numbers (n-1) through 1, separated by spaces (i.e. n-1, n-2, ..., 1). Continue up to the nth line which prints a 1. For example, for n= 5, the output will look like the following: 1

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

2. (a) Write a C program that will print results according to the number given as input 4

Sample Input for number N	Sample output
5	1 2 3 4 5 2 3 4 5 1 3 4 5 1 2 4 5 1 2 3 5 1 2 3 4

   (b) Improve the following code fragment by choosing efficient construct:. 1

```
1 int i;
2 char ch, str[100];
3 i = 0;
4 while(scanf("%c",&ch)==1){
5     if(ch != '\n' && ch != '\t'){ str[i++]=ch; continue; }
6     if(ch == '\n') break;
7     if(ch == '\t') ch = ' ';
8     str[i++] = ch;
9 }
```

   (c) Assume that you are given two text files named *first.txt* and *second.txt*. Write a C program that copies the content of *first.txt* and pastes it into *second.txt* before its original content.

(d) Consider the following C program. List all the syntax errors of the source code.

```
#include<studio.h>
#include<mathematics.h>

int main(){
    double v1, v2;
    char str[100], ch;
    scanf("%d%d%s%c,v1,v2,&str,&ch);
    if(v1 >> v2 || sqrt(v1) < 100))){
        printf("Mark 1);
    }else if{
        printf(Mark 2)
    }
    return 0;
}
```

3. (a) The following C code fragment is supposed to print the sum of all Armstrong numbers between A and B (inclusive), where A and B are integers taken from user. For your information: *If sum of cubes of each digit of the number is equal to the number itself, then the number is called an Armstrong number. For example, 153 = (1*1*1)+(5*5*5)+(3*3*3), thus 153 is an Armstrong number.* But unfortunately, the following program does not produce correct answers. Find out and correct logical errors from the program. (Try to alter the code minimum as possible):

```
#include<stdio.h>
int isArmstrong(int x){
    int c;
    int p = x;
    while(x!=0){
        c *= (x%10);
        s += c;
        x /= 10;
    }
    if(s==p)
        return p;
    else
        return 0;
}
int main(){
    int A, B, i, sum;
    scanf("%d%d",&A,&B);
    for(i = 0; i<B; i++){
        sum += isArmstrong(i);
    }
    printf("Sum = %d\n",sum);
}
```

(b) An insurance company follows following rules to calculate premium:

i. If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then the premium is 5 taka per thousand and his policy amount can not exceed 2 lakhs.

ii. If a person satisfies all the above conditions except that she is a female then the premium is 4 taka per thousand her policy amount can not exceed 1 lakh.

iii. If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then the premium is 6 taka per thousand and his policy can not exceed 10000 taka.

iv. In all the other cases, the person is not insured.

Write a C program that will take from user a person's age, gender, health condition and living address (whether village or city), then output whether the person should be insured or not. If he is insured, then print his/her premium rate and maximum amount for which (s)he can be insured.

Department of Computer Science and Engineering

1st Year 1st Semester B.Sc. Examination 2011

CSE - 1101 : Computer Fundamentals

Total Marks: 60 Time: 2.5 Hours

[Answer any four (4) of the following Questions.]

1. (a) Discuss the classification of computers on the basis of size and capacity. 6
   (b) Describe the capabilities and limitations of computers. 3
   (c) Clearly describe the impact of computerization on modern society. 5
   (d) Differentiate between data and information. 3

2. (a) Draw a block diagram of a digital computer. Explain how the CPU and memory work together. 4
   (b) Briefly discuss the bus architecture of a digital computer. 3
   (c) What is generation of computers? Explain different generations of computers. 5
   (d) How is a PC different from a workstation? Explain the different types of portable computers. 3

3. (a) What is the benefit of using 'QWERTY' layout keyboard? What are the different types of mice used in a computer system? 1+2
   (b) What is the difference between OCR and OMR? 2
   (c) Define resolution and refresh rate of a monitor. To display an image with 640 x 480 resolution with 8 bit colors, how many bytes must be sent from the computer to the monitor? 2+2
   (d) What are the advantages and disadvantages of CRT and LCD monitors? 3
   (e) Compare dot matrix, ink jet and laser printers in terms of performance. 3

4. (a) Draw the memory hierarchy based on the capacity, cost per bit and access time. 3
   (b) Mention the difference between SRAM and DRAM. 2
   (c) Compare hard disk and magnetic tapes in terms of advantages and disadvantages. 3
   (d) Define the parameters for measuring the performance of a hard disk? 3
   (e) What is the purpose of using cache memory? What is the difference between CD-R and CD-RW? 2+2

5. (a) Briefly discuss the different types of system software with examples. Compare compiler and interpreter. 4
   (b) What is operating system? Explain the major functions of operating systems. 3
   (c) What is programming language? Distinguish between machine language and high-level language. 3
   (d) Explain the features of Linux and MS-DOS. Compare multitasking and multiprocessing operating systems. 4
   (e) Define the application software with examples. Mention the characteristics of application software. 3
   (f) Briefly discuss the basic concepts of database. 3

6. (a) Describe the different topologies of a LAN network. 4
   (b) What is computer network? Explain the main features of different internet services. 4
   (c) What is e-mail? Distinguish between LAN and WAN. 3
   (d) Define the bandwidth with examples. Discuss the features of different transmission media. 4
   (e) What is OSI? Explain the necessities of network protocols. 3