Saima

18th Batch

University of Dhaka

Department of Computer Science and Engineering

2nd year B. Sc. in Computer Science (1st Semester) Examination 2013

CSE 2101: Data Structures

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

Answer any four (4) questions.

1. a) An array A contains 25 positive integers. Write a module which 6

   i) Finds all pairs of elements whose sum is 25.
   ii) Finds the number of EVNUM of elements of A which are even, and the number ODNUM of elements of A which are odd.

   b) Discuss the advantages, if any, of a two-way linked list over a one-way linked list for each of the following operations. 4

   i) Traversing the list to process each node
   ii) Deleting a node whose location LOC is given
   iii) Searching an unsorted list for a given element ITEM
   iv) Inserting a node before the node with a given location LOC

   c) Write down a procedure which removes the first element of a linked list and adds it to the end of the list without changing any values in INFO. 5

2. a) What is meant by recursive function? Mention the two properties of a recursive function. 5

   b) Let n denote a positive integer. Supposes a function L defined recursively as follows: 5

$$L(n) = \begin{cases} 0 & if\ n = 1 \\ L\left(\frac{n}{2}\right) + 1 & if\ n > 1 \end{cases}$$

   Find $L(25)$.

   c) Probably you have solved the problem "Tower of Hanoi" with three pegs and N number of disks. Did you ever imagine the scenario where number of pegs increases? Anyway, this will be almost similar to the traditional version with three pegs and some slight modification will do. Now, your task is to consider a scenario of Tower of Hanoi with 4 pegs and 5 disks. Write down the number of moves with association of the moves. 5

3. a) Draw the binary search tree with the following numbers. 4

   45, 33, 23, 78, 43, 22, 13, 21

   Find the inorder successor of 43.

   b) Perform Heap sort on the following data set. First you have to construct the Heap tree and perform relevant operation on the tree to sort the data set. Note: you have to illustrate each step in details. 5

   25 -99 7,6,0,28,89,-89,67,-2013

   c) What is priority queue? How do you implement a priority queue? Give an outline of enqueue and dequeue operation in a priority queue. 6

4. a) Convert the following expression into its equivalent postfix notation and evaluate the postfix version. Note: you have to sketch each step in details including the insertion of operators in stack. 4

   i. 25 + 21 *(-19 * (5 + -14)) - -9

   b) Mention the properties of a red-black tree. 2

   c) Distinguish between AVL tree and red-black tree. 3

   d) Show the red-black tree that result after successively inserting the keys 41, 38, 31, 12, 19, 8 into an initially empty red-black tree. Please show the intermediate steps. 6

5. a) Write a procedure to merge two sorted list into one sorted list. 4

b) Consider a circular queue of size 8 with currently holding value for FRONT = 3, REAR = 7. Assume that the queue indexing starts with 0. 4

i. Find the total number of data in the queue.

ii. Describe the queue w.r.t. FRONT and REAR:

1. If three new data 7, 9 and 11 are added
2. If two data are deleted and one new data '21' is added
3. Current status of the queue after deleting 5 data items

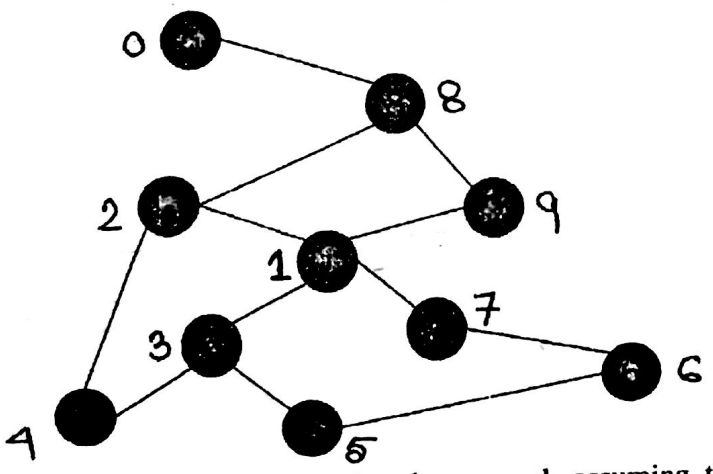
c) Consider the following list of numbers. 7

24, 33, 7, 29, 83, 77, 11

Sort the above mentioned numbers using quick sort algorithm and show the every step.

6. a) What are the different approaches to represent a graph into memory? Describe one of them with example. 5

b) Breadth First Search is a popular graph search strategy. Is not the name peculiar? Did you ever try to know the fact behind its peculiar name? Anyway, irrespective of the naming, it's a very important graph traversal technique which can cover shortest path between any two nodes of an un-weighted or equally weighted graph. For the below given graph, traverse the nodes which are reachable from the node '6' using BFS. 5



c) Perform topological sort on the above graph assuming the edges of the graph is directed. For clarity, the direction will be from lower label node to higher label node. 5

University of Dhaka
Department of Computer Science & Engineering
2nd Year B.Sc. in Computer Science (1st Semester) Examination' 2013
CSE 2102: Object oriented Programming

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

Answer Any Four Questions

1. (a) Explain how Java ensures portability and security of a program. 3
   (b) The following program contains compile time errors. Identify and explain each of the errors and also write the exact line of code you should change to fix the error. 6

```
public class Interesting {
 public static void main (String[] args) {
        final int k = 1;
        int[] y;
        String[] myTestStrings = {'first', 'second'};
        boolean b = false;

        if(myTestStrings.length() == 2) {
                System.out.println(myTestStrings[2]);
        }

        for (int i = 0; i < 100;) {
                y[i] = k;
                i = incrementCounter(i);
        }

        if (!b) {
                System.out.println("This line should always be printed.");
        }
        if (b = true) {
                System.out.println("This line should never be printed in all cases.");
        }
}
 public int incrementCounter (int i) {
        return (i + 1);
 }
}
```

   (c) What happens when a return type, even void, is specified for a constructor? 3
   (d) Explain with a simple example, how constructors are called in case of multi level inheritance. 3

2. (a) Discuss the concept 'One interface, Multiple Methods' of Java. 3
   (b) How does polymorphism promote extensibility? 3

(c) Consider the following code segment:

```
public interface Red{
        public void turnRed();
}
public interface Blue{
        public void turnBlue();
}
```

```
public class A implements Red {
    public void one() {
            System.out.println( "A.1" );
    }
    public void two(){
            one();
            System.out.println( "A.2" );
}
    public void turnRed() {
        System.out.println("Nooooo!!");
}
```

```
public class B extends A implements
Red, Blue {
    public void one( int x){
        System.out.println( "B.1 " + x );
}
    public void two() {
        System.out.println( "B.2" );
}
    public void turnBlue() {
        System.out.println("Aaiiee!!");
}
```

```
public class C extends A {
    public void one() {
        System.out.println( "C.1" );
}
}
```

For each of the following, determine the output when the code will be executed. If some sort of errors are generated, give a brief explanation of the problem.

(a) *A a = new B();* *a.two();* A.1 A.2	(b) *B b = new B();* *b.one(4);* *b.one();* B.1 4 A.1	(c) *Red r = new B();* *r.turnRed();* Nooooo!!	
(d) *Blue b = new Blue();* *b.turnBlue();* Error	(e) *C c = new A();* *c.two();* Error	(f) *A a = new B();* *a.turnBlue() ;* Error	(g) *A a = new C();* *a.two();* A.1 A.2

3. (a) What are the advantages of using interface? 3

(b) Write a Java program that will create a class called ***Circle*** with the following properties: 7

(i) Three private instance variables: ***center_x*** (double), ***center_y*** (double) and ***color*** (String).

(ii) A parameterized constructor to initialize all the data members.

(iii) A parameterized constructor to initialize all the data members using that of an object of ***Circle***.

(iv) A ***toString()*** method to return a string description of the instance of ***Circle***.

(v) A method called ***find_distance (double center_x, double center_y, String color)*** will return true if the distance between the center of the calling object and the center of the circle represented by the parameters is zero and color is same. Otherwise it will return false.

(vi) A method called ***find_distance (Circle C)*** will return true if the distance between the center of ***C*** and the center of the calling object is zero and color is same. Otherwise it will return false.

Write appropriate code to access the ***Circle*** class.

(c) Identify errors in the following program and state the reasons of the errors: 5

```
class test
{
    void meth1(byte b, float f, char c)
    {
      long x=b;
      x=f;
      c=b;
      f=c;
    }

    public static void main(String args[])
      {
          float b=5.35;
          char m='d';
          int z=264;

          for(int i=0, int a=25; i<20; i++)
          {
              int k=(k+i+b)*a;
              meth1(z , b, m);

          }
          System.out.println("k: "+k+ " i: "+i+ " a: " +a);
    }
```

4. (a) Write a program that will take some positive integers from the keyboard and find their summation. If any negative number is input, then your program should handle it with a user-defined exception. 6

(b) How can you define chained exception in Java? Explain your answer with a simple java program. 3

(c) Discuss the event delegation model of Java. 3

(d) Consider the following statements: 3

```
int a[];
int b[] = null;
int c[] = new int[5];
int d[] = { 1, 2, 3, 4, 5 };
a = c;
d = c;
```

For each of the statements show the memory allocation.

5. (a) Write a Java program that will run two threads **t1** and **t2** besides the **main** thread. Use **Thread** class to create your threads. Thread **t1** will increase the value of an integer variable by 10 for 5 times whereas thread **t2** will decrease the value of an integer by 2 for 7 times. 6

(b) What is containment hierarchy of a Swing program? Explain your answer with a simple swing program. 4

(c) Write a Java Program that will create a class known as ***Course***. This class should have the following properties: 5

(1) Two private data members: ***course_id***(String) and ***course_name***(String).

(2) A parameterized constructor to initialize the data members.

(3) An implementation of ***toString()*** method.

Now write ***main()*** method to perform the following operations:

(1) Create an object of ***ArrayList*** that will contain a list of courses.

(2) Now insert the following data:

{CSE2101, "Data Structure"}, {CSE2102, "OOP"}, {CSE2103, "Computer

Architecture"}, {MTM2121, "Linear Algebra}, {STAT2122, "Probability"}, {BUS2123, "Business"}.

(3) Show the number of elements in the array.

(4) Remove {CSE2103, "Computer Architecture"} and {STAT2122, "Probability"}

(5) Display the content of the list.

6. (a) Write an applet that asks the users to enter two floating-point numbers. Your program should obtain the two numbers from the user and find the sum, product (multiplication), difference and quotient (division) of these numbers. 7

(b) Write an applet that will draw rectangles of different sizes at different locations. 5

(c) Create a Java program that will repeatedly flash an image on the screen. Perform this operation by alternating the image with a plain background color image. 3

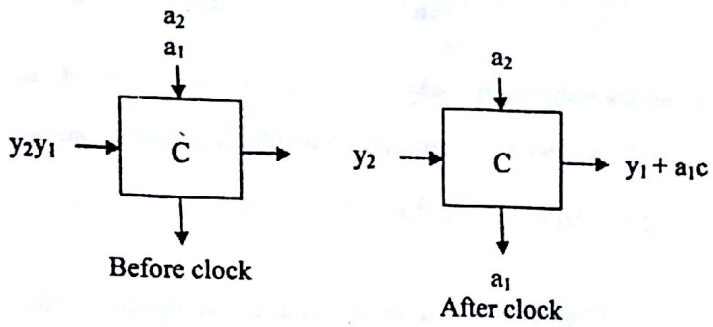
University of Dhaka
Department of Computer Science and Engineering
2nd Year B.Sc. in Computer Science (1st semester) Examination, 2013
CSE 2103: Computer Architecture

Total Mark: 60

Time: 2.5 Hours

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

1. a) Explain the working principle of systolic array processors. 3
   b) Mention the advantages and disadvantages of a systolic array over a conventional computer system. 4
   c) Consider the systolic array element shown next: 8



How will the following matrix multiplication be performed using the set of these elements?

$$\begin{pmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{pmatrix}$$

Show data organization.

2. a) Define pipelined processing. Discuss the working principle of a four-segment pipeline, where four activities of a task T are carried out. Also, draw the space time chart of task T. 8
   b) Why the pipelined processing is more steady than a conventional computer system? Justify your answer. 4
   c) Assume that T_1=40 ns; T_2=100 ns; T_3=180 ns and T_4=60 ns. Determine the pipeline clock rate. 3

3. a) What is memory organization? Describe the memory organization of a computer system. 2
   b) Explain the working principle of a 1K × 4 RAM using its truth table. 3
   c) Design a 4K × 4 RAM using four 1K × 4 RAMs. 5
   d) Mention the different factors that affect the performance of a memory hierarchy. 2
   e) What is mapping of a main memory? Describe three mapping techniques of a main memory. 3

4. a) Explain Booth's multiplication algorithm with a suitable example. 5
   b) Compute all the signals generated by a carry-look ahead adder for the following example: Add 1110 with 0111. 4
   c) Explain the major groups of computers according to Flynn's classifications. 3
   d) What is coprocessor? 3

5. a) What is load data hazard? Describe with an example how load data hazard is avoided? 4
   b) A high level language equation is given as $Z = A * B + C * D + E * F$. Write its equivalent 4
      i). Three address
      ii). Two address
      iii). One address
      iv). Zero address instructions.
   c) What is locality of reference? Explain its importance in cache memory. 4
   d) Name different cache replacement algorithm. Briefly explain any one of them. 3

6. a) Describe the instruction sets of CISC and RISC with their formats. 4
   b) Discuss different addressing modes of instructions with their advantages and disadvantages. 5
   c) Discuss different types of interrupts of a computer system. 2
   d) Explain MC68000 interrupt I/O. 2
   e) Discuss the importance of exception handling and error recovery in MC68000. 2

University of Dhaka
Department of Computer Science and Engineering
2nd Year B.Sc. in Computer Science (1st semester) Examination, 2013
MTM 2121: Ordinary Differential Equation

Total Mark: 60 Time: 2.5 Hours

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

1. a) Explain, with examples, the order and degree of a differential equation. Find the degree and order of the following differential equations. 5

(i) $\left(\frac{dr}{ds}\right)^3 = \sqrt{\frac{d^4r}{ds^4}+2}$ (ii) $\left(\frac{d^2y}{dx^2}\right)^{\frac{1}{4}} = k + \left(\frac{dy}{dx}\right)^2$

b) Formulate the differential equation of a circle which passes through the origin. 5

c) Use necessary and sufficient condition for exactness to solve the ODE 5

$$(2x\cos y + 3x^2y)dx + (x^3 - x^2\sin y - y)dy = 0$$

2. a) Solve the ODE by substitution method $\frac{dy}{dx} = e^{x-y} + x^2e^{-y}$ 5

b) Solve the ODE by Bernouli's method $\frac{dy}{dx} + y\tan x = y^3\sec x$ 5

c) Solve the 4th order homogeneous ODE $(D^4 + 4D^2 + 16)y = 0$ 5

3. a) Solve the initial value problem of the non-homogeneous ODE 8

$y'' - 2y' - 3y = 2e^x - 10\sin x$ by the method of Undermined Coefficient.

b) Solve the non-homogeneous ODE $y'' + y = \sec x$ by the method of Variation of Parameter. 7

4. a) Write down the general form of the Cauchy – Euler equation. Find the general solution of the differential equation : $x^2y'' - 5xy' + 8y = 2x^3$ 8

b) If $y = x$ is a solution of the differential equation $x^2y'' - 4xy' + 4y = 0$, find a linearly independent solution by reducing the order. Write the general solution. 7

5. a) Define ordinary point, singular point, and regular singular point with examples. 5

b) Use the method of Frobenius to find the solution near $x = 0$ of the differential equation: $2x^2y'' + xy' + (x^2 - 1)y = 0$ 10

6. a) Find the general solution of the linear system: 7

$$\frac{dx}{dt} = 4x - y$$

$$\frac{dx}{dt} = x + 2y$$

b) The population of Bangladesh become twice at 30 years. When will the population be triple? The population increases at a rate proportional to the present population. 8

University of Dhaka
Department of Computer Science & Engineering
2nd Year B.Sc. in Computer Science (1st Semester) Examination' 2013
STAT 2122: Introduction to Probability

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

Answer Any Four (4) Questions

1. (a) Define and illustrate with examples: 5
(i) sample space (ii) event (iii) event space (iv) mutually exclusive events
(v) collectively exhaustive events

(b) When an experiment is said to be a random experiment? Do the following experiments satisfy the conditions to be a random experiment? 4
(i) Multiplying 4 and 8 on a calculator (ii) Birth of human baby.

(c) Florin Frenti operates a small used car lot that has three Mercedes (M_1, M_2, M_3) and two Toyotas (T_1, T_2). Two customers, Cezara and Anda, come to his lot and each selects a car. The customers do not know each other, and there is no communication between them. Let the events A and B be defined as follows: 6

A: The customers select at least one Toyota.

B: The customers select two cars of the same model.

Answer the following questions:

(i) Identify the pairs of cars of the same model.
(ii) Describe the event A.
(iii) Describe the event B.
(iv) Describe the complement of A.
(v) Show that $(A \cap B) \cup (A \cap B') = A$
(vi) Show that $A \cup (A \cap B) = (A \cup B)$

2. (a) The probability that an automobile battery subject to high engine compartment temperature suffers low charging current is 0.7 and the probability that a battery is subject to high engine compartment temperature is 0.05. Find the probability that a battery is subject to low charging current and high engine compartment temperature. 4

(b) Suppose that a team of programmers is to be made up of four from DU and two from BUET who will participate an international computer programming contest. A number of 11 potential programmers are available of whom six from DU and five from BUET. Answer the following questions: 8

(i) How many different combinations are possible?
(ii) One programmer of DU and one from BUET are friends. If the programmers are selected at random, what is the probability that both the friends will be selected in the team?
(iii) What is the probability that at least one of the friends will be selected in the team?
(iv) What is the probability that neither of the friends will be selected in the team?

(c) A town has two fire engines operating independently. The probability that a specific fire engine is available when needed is 0.99. Answer the following questions: 3

(i) What is the probability that neither is available when needed?
(ii) What is the probability that an engine is available when needed?

3. (a) State and prove the Bayes' theorem. 5

(b) Examination results of 150 students showed that 95 students passed mathematics, 75 students passed statistics and 135 students passed at least one of the above subjects. A student is selected at random. What is the probability that the student 6

(i) Passed both mathematics and statistics?
(ii) Failed both the subjects?
(iii) Passed Statistics but failed mathematics?

(c) A semiconductor manufacturer has the following data regarding the effect of contaminants on the probability of chip failure 4

Probability of Failure	Level of Contamination
0.1	High
0.01	Medium
0.001	Low

In a particular production run 20% of the chips have high-level, 30% have medium-level, and 50% have low-level contamination. What is the probability that one of the resulting chips fails?

4. (a) A manufacturer produces certain type of transistor. The lifetime of transistor is a random variable X, measured in hours, which is assumed to have the probability density function (p.d.f) 4

$$f(x) = \begin{cases} ke^{-\theta x}, & x \geq 0 \\ 0 & otherwise \end{cases}$$

Find the value of k for which $f(x)$ to be a p.d.f and then find its cumulative density function (c.d.f). Also calculate the probability that lifetime of transistor is more than 10.

(b) For joint density function 6

$$f(x,y) = \begin{cases} \dfrac{x(1+3y^2)}{4}, & 0 < x < 2, \quad 0 < y < 1 \\ 0, & elsewhere \end{cases}$$

Find $g(x), h(y), f(x|y)$ and $P\left[\frac{1}{4} < X < \frac{1}{2} \middle| Y = \frac{1}{2}\right]$.

(c) Define conditional expectation and conditional variance. Show that 5

$$Var[Y] = E[Var(Y|X)] + Var[E(Y|X)]$$

5. (a) What do you mean by raw moment, central moment and moment about origin? Define moment generating function and cumulant generating function. If X_1 and X_2 are independent random variables with moment generating functions $M_{X_1}(t)$ and $M_{X_2}(t)$ respectively, and $Y = X_1 + X_2$, then show that $M_Y(t) = M_{X_1 + X_2}(t) = M_{X_1}(t) \times M_{X_2}(t)$. 6

(b) A traffic control officer reports that 75% of the trucks passing through a check post are from Dhaka city. What is the probability that at least three of the next five trucks are from out of the city? 3

(c) The average number of calls received by a telephone operator during a time interval of 10 minutes from 5 pm to 5:10 pm daily is 3. What is the probability that the operator will receive (i) no call (ii) one call and (iii) at least two calls tomorrow during the same time interval? 6

6. (a) Write down the probability function of normal distribution with graphical presentation. State the important properties of normal distribution. 5

(b) Define uniform random variable and show the probability function for discrete and continuous uniform random variable. A repair team is responsible for a stretch of oil pipeline 2 miles long. The distance (in miles) at which any fracture occurs can be represented by a uniformly distributed random variable, with probability density function 5

$$f(x) = \begin{cases} \frac{1}{2} = 0.5 & 0 < x < 2 \\ 0 & Otherwise \end{cases}$$

Find the cumulative distribution function and the probability that any given fracture occurs between 0.5 mile and 1.5 mile along this stretch of pipeline.

(c) Define geometric and negative binomial random variable with their pmf. The life time of a certain brand of computer component X has a normal distribution with mean of 35000 hours and standard deviations 4000 hours, i.e., $X \sim N(35000, 4000)$. 5

(i) What is the probability that a randomly selected component of the brand has a life time more than 38000 hours?

(ii) What proportion of components of the brand has a life time of less than 32000 hours?

(iii) What is the probability that a randomly selected component of the brand has a life time between 32000 and 38000 hours?

APPENDIX V1 Cumulative Normal Distributions

$$\Phi(x)=\int_{-\infty}^{x}\frac{1}{\sqrt{2\pi}}e^{-t^2/2}\,dt$$

x	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

x	1.282	1.645	1.960	2.326	2.576	3.090	3.291	3.891	4.417
$\Phi(x)$	.90	.95	.975	.99	.995	.999	.9995	.99995	.999995
$2[1-\Phi(x)]$	.20	.10	.05	.02	.01	.002	.001	.0001	.00001

University of Dhaka

Department of Computer Science and Engineering

2nd year B. Sc. in Computer Science (1st Semester) Examination 2013

BUS 2123: Introduction to Business

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

Answer any four (4) questions.

1.	a)	Why do some small business typically fail to achieve their goals? Discuss.	7
	b)	Suppose you are going to set individual objectives. Describe how you can improve upon the establishment of objectives and the monitoring of your progress.	8
2.	a)	Some cattle growers have formed a company to sell processed beef in Dhaka city. How would the company develop a marketing strategy?	7
	b)	Why do firms engaged in international business often have to adapt to foreign markets? Give an example of how products, prices, distribution methods and promotion might have to be adapted to a foreign country.	8
3.	a)	Who is an entrepreneur? Why do some firms encourage entrepreneurship?	6
	b)	How would you decide what type of business is right for you when you are going to start a software firm? Justify your answer.	9
4.	a)	Discuss Maslow's view of needs and motivation.	5
	b)	Differentiate between democratic leadership and autocratic leadership.	4
	c)	If you were opening an new business, what should you consider relative to be needed to start-up capital? Be as specific as possible.	6
5.	a)	How does marketing add value to products?	4
	b)	Identify the factors that affect consumer-buying decision.	6
	c)	Describe various levels of product life cycle.	5
6.	a)	Discuss differences between balance of payment and balance of trade with appropriate examples.	3
	b)	A balance sheet and an income statement of the Classic Music Company Limited are given in the next page	

The Classic Music Company Limited
Comparative Balance Sheets
December 31, 2011 and 2012

	1991 2		Percentage of total assets	
		~~1990~~ 2011	~~1991~~ 12	1990 2011
Assets				
Current assets:				
Cash	Tk. 40,000	Tk. 62,000	13.6%	22.0%
Account receivable	70,000	50,000	23.7	17.7
Inventory	110,000	85,000	37.3	30.1
Total current assets	220,000	197000	74.6	69.8
Fixed assets:				
Store equipment (net of accumulated depreciation)	25,000	25,000	8.5	8.9
Furniture and fixtures (net of accumulated depreciation)	50,000	60,000	16.9	21.3
Total fixed assets	75,000	85,000	25.4	30.2
Total assets	Tk. 295,000	Tk. 282,000	100.0%	100.0%
Liabilities				
Current liabilities:				
Account payable	Tk.55,000	Tk. 50,000	18.6%	17.7%
Long-term liabilities:				
Notes payable	150,000	150,000	50.8	53.2
Total liabilities	205,000	200,000	69.4	70.9
Owners' equity				
Capital stock	40,000	40,000	13.6	14.2
Retained earnings	50,000	42,000	16.9	14.9
Total owners' equity	90,000	82,000	30.5	29.1
Total liabilities and owners' equity	Tk. 295,000	Tk.282,000	100.0%	100.0%

The Classic Music Company Limited
Comparative Income Statements
For the Years Ended December 31, 2011 and 2012

	2012	2011	Percentage of total assets 2012	2011
Net Revenue	Tk.800,000	Tk.720,000	100.0%	100.0%
Cost of sales	640,000	590,000	80	82
Gross Profit	160,000	130,000	20	18
Operating expenses:				
Selling expenses				
Sales salaries	39,500	35,000	4.9	4.9
Advertising	4,000	3,000	0.5	0.4
Total selling expenses	43,500	38,000	5.4	5.3
General and administrative expenses				
Administrative salaries	39,500	35,000	4.9	4.8
Rent	15,000	10,000	1.9	1.4
Utilities	6,000	2,500	0.8	0.3
Insurance	2,000	2,000	0.2	0.3
Depreciation	15,000	15,000	1.9	2.1
Total general expenses	77,500	64,500	9.7	8.9
Total operating expenses	121,000	102,500	15.1	14.2
Income from operations	39,000	27.500	4.9	3.8
Interest expenses	15,000	15,000	1.9	2.1
Income before taxes	24,000	12,500	3.0	1.7
Income tax expenses (at 36 percent)	8,640	4,500	1.1	0.6
Net income	Tk.15,360	Tk. 8000	1.9%	1.1%

Calculate and interpret the following ratios: 8

i) Liquidity ratios (Current ratios and Quick ratio) +
ii) Activity ratios (Accounts receivable turnover) 4
iii) Profitability Rations (Return on sales and Return on equity)
iv) Debt ratios (Debt to total assets ratio and Times interest earned ratio