Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(CSE)/SEM-7/CS-704H/2009-10

2009

NETWORK APPLICATIONS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives of the following : 10 × 1 = 10

   i) Entropy of a message gives us the measure of

      a) number of symbols in the message

      b) number of bits require to represent the message

      c) number of repetitions for each symbols in the message

      d) number of statistical dictionary entries.

   ii) Shannon-Fano coding is a typical case of

      a) differential compression

      b) dynamic dictionary based compression with substring matching

      c) fixed length coding

      d) statistical encoding, that is based on probability of symbols.

iii) In case of LZ78, the transmitted encoded data from the sender to the receiver consists of

a) only the dynamic dictionary that is generated during encoding

b) both the compressed encoded data and dynamic dictionary, that is generated during encoding

c) only the compressed encoded data

d) none of these.

iv) Arithmetic encoding, can be considered as

a) dynamic dictionary based compression

b) statistical modeling based encoding

c) both (a) and (b)

d) none of these.

v) In case of distributed DBMS, the horizontal fragments are mainly based on

a) attributes or columns of a relation

b) primary key of a relation

c) records or tuples of a relation

d) all of these.

vi) In case of distributed DBMS reference architecture, the site independent schema can be considered as

a) local schema

b) global schema

c) horizontally fragmented schema

d) vertically fragmented schema.

vii) In case of asymmetric key cryptography the sender encrypts the plain text with the

a) sender's private key b) sender's public key

c) receiver's public key d) receiver's private key.

viii) When the sender sends a data to the receiver then, interception and subsequent modification of the data by an intruder implies that, it is a case of

a) DOS attack b) worm attack

c) both (a) and (b) d) active attack.

ix) In case of distributed DBMS the physical image of a global relation R with its ith fragment is at site j is denoted by

a) R_j^i b) R_i^j

c) R_{i+j} d) R_{i*j}.

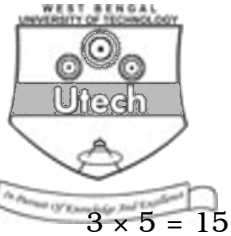
x) Fabrication attack is possible in the absence of

a) private key of the receiver

b) public key of the receiver

c) both (a) and (b)

d) proper authentication mechanism in the transmission.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. a) What do you mean by Fixed Length Coding and Variable Length Coding ? Explain with examples.

   b) What do you mean by compression ratio ? 2 + 2 + 1

3. a) What do you mean by entropy ?

   b) What is 'minimum redundancy coding' ? Give one example of a minimum redundancy coding based data compression technique ? 2 + 2 + 1

4. a) Discuss the concept of 'global query processing' in case of distributed data base management systems, with an example.

   b) What do you mean by 'mixed fragmentation' in case of distributed data base management systems ? 3 + 2

5. What do you mean by public and private key encryption technique ? What is the importance of key size in case of symmetric key encryption ? 2 + 2 + 1

6. a) What do you mean by DOS attack ?

   b) Is there any difference between the functionality of virus and worm ? Explain.

   c) What is cryptanalysis ? 2 + 2 + 1

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) What are the main advantages of data compression ? 3

b) What do you mean by differential encoding ? Explain. 3

c) Write the names of two statistical modeling based compression technique and one dynamic dictionary based compression technique. 1 + 1 + 1

d) Consider the following sequence of symbols in a message as

AAAABBCCDDDD

Now based on the entropy, for each individual symbol, calculate the number of bits required for representing each of these individual symbols in the above message. Hence also calculate the average code length (based on the entropy of the individual symbols), in bits/symbol for this whole message. 2 + 1

e) Consider the following message, with the sequence of symbols are

CCCCCDDDEEPPPPP

Now perform the RLE on this message and write the corresponding encoding for the whole message. Hence also find the compression ratio for the whole message based on this RLE (make your own suitable assumptions). 2 + 1

8. a) Why can dynamic dictionary based compression techniques be considered as a preferable option in comparison to statistical modeling based compression techniques ? 4

b) Discuss Shannon-Fano coding with a short example. 4

c) Consider the following messages, with the sequence of symbols are

A A B C D A B E C E .

Now perform the LZ78 encoding for this above mentioned message and write the corresponding encoding for the whole message. Hence also find the compression ratio for the message based on this computed LZ78 encoding (make your own suitable assumptions). 6 + 1

9. a) Discuss some of the advantages and disadvantages of replication in case of distributed DBMS ? 3 + 2

b) Discuss the distriuted DBMS reference architectue with a suitable diagram. 5

c) What are the different levels of distribution transparency that exists in case of distributed DBMS ? Describe with the suitable diagram. 5

10. a) What do you mean by passive and active attacks ? 2

b) Discuss the following terms regarding the different types of security attacks :

i) Interception

ii) Fabrication

iii) Modification

iv) Interruption. 2 + 2 + 2 + 2

c) Compare the advantages and disadvantages of symmetric and asymmetric key encryption. 3

d) What do you understand by mark up language ? 2

11. Write short notes on any *three* of the following : 3 × 5

a) Huffman encoding

b) Check pointing and cold restarts

c) FTP

d) Digital signature and message digests

e) Horizontal and vertical fragmentation.