Institute of Information Technology

Jahangirnagar University

Professional Masters in IT

2nd Semester Final Examination Summer 2022 | **Intake: Spring 2022, Fall 2021**

Duration: 3 Hours | Full Marks: 60

Course Code: PMIT – 6104 | **Course Title: Database Security**

Do not write anything on the question paper.

There are **7 (Seven)** questions. Answer any **5 (Five)** of them.

Figures in the right margin indicate marks.

1. a) What is the role of security policy in implementing Database Security? **(2)**

b) Discuss the shortcomings that lead to Database Security vulnerabilities. **(2)**

c) What is the simple security property in the *Bell-Lapadula model*? **(3)**

d) What are *Access Control Models*? What is the difference between Discretionary Access Control (DAC) and Mandatory Access Control (MAC)? **(3)**

e) Company X is planning to implement rule based access control mechanism for controlling access to its information assets, what type of access control is suitable for this case and why? **(2)**

2. a) What is meant by *Covert Channels*? How does it work? **(3)**

b) What is meant by *Polyinstantiation*? How does *Polyinstantiation* occur in your database? **(2)**

c) What type of access control does Linux generally support, and what impact does this have on security? **(2)**

d) How is mandatory access controls implemented in Linux? **(2)**

3. a) What will happen if you watermark the watermarked image? Could this be regarded as a kind of attack? And if so what is its effect? **(4)**

b) Can the steganography be used together with cryptography to enhance information hiding and obscuring? **(3)**

c) How do you hide a message into an image LSB steganography method? **(5)**

4. a) What are the three components of *Trust Management*? **(2)**

b) What is a certificate authority? Explain a scenario in which they are useful. **(2)**

c) What is the web of trust model in PGP? **(3)**

d) Alice receives an email, apparently signed using a PGP private key by Bob. She does not know Bob's public key, but she knows and has signed the public keys of Carol and Dave. Dave has signed the keys of Alice, Bob and Eve. Eve has signed Carol's and Dave's keys. Alice has "complete trust" in Dave, and "part trust" in Carol and Eve. Should Alice accept the signature on Bob's email? Explain your answer, specifying any assumptions you make about PGP. **(3)**

e) When a security administrator wants to conduct regular test on the strength of user passwords, what may be the best setup for this test? **(2)**

5. a) What is *statistical database?* **(2)**

b) What is *Data Perturbation*? How does Input perturbation and output perturbation works? Explain with necessary works. **(4)**

c) How do you secure your database by using "query set size control"? **(4)**

d) A system security engineer is evaluation methods to store user passwords in an information system, so what may be the best method to store user passwords and meeting the confidentiality security objective? **(2)**

6. a) What is Hadoop framework? On What concept the Hadoop framework works? (3)

b) Explain the *WordCount* implementation via Hadoop framework? Assume there are two files each having a sentence. (4)

```
Hello World Hello World (In file 1)
Hello World Hello World (In file 2)
```

c) What are the primary phases of the Reducer? (3)

d) What is HDFS ? How it is different from traditional file systems? (2)

7. a) Write down the points/factors upon which the Access Control of a Geospatial database is designed? (4)

b) Consider the following authorization: (3)
"John is allowed to access a region centered at point (50,60) with width and height of 10 in LANDSAT images, with a zoom-in level of up to 8, during 1 January 1999 and now".
Write down the corresponding *Geotemporal Authorization.*

c) Explain the vector data and raster data model in geospatial database. (5)