ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

FINAL EXAMINATION **SUMMER SEMESTER, 2019-2020**

DURATION: 1 Hour 30 Minutes **FULL MARKS: 75**

HUM 4441: Engineering Ethics

Programmable calculators are not allowed. Do not write anything on the question paper.

Figures in the right margin indicate marks.

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1. Consider the following dataset.

Student ID	Zip	Age	Gender	Avg. GPA in Core Courses	Overall CGPA
2018-1-60-001	1215	19	M	3.05	2.95
2017-2-60-101	1216	21	F	3.85	3.90
2018-2-60-002	1300	22	F	2.56	2.43
2017-3-60-130	1212	20	M	3.75	3.65
2018-1-60-002	1805	24	M	2.98	3.13
2016-3-60-096	1310	22	F	3.35	3.50
2017-3-60-002	1312	19	F	3.97	3.99
2017-1-60-007	1315	20	M	3.65	3.67
2018-1-60-054	1216	20	M	3.24	3.40
2017-2-60-012	1805	21	M	2.75	2.85
2016-2-60-081	1880	21	F	3.49	3.45
2018-2-60-062	1505	23	F	2.99	3.01

Here, Student ID is the unique identifier and {Zip, Age, Gender, Avg. GPA in Core Courses} are quasi-identifiers, and Overall CGPA is the sensitive information.

a) Data anonymization helps to protect 'Personal Data, ' which is vital from ethical grounds. 15

Apply the following data anonymization techniques to create an anonymized dataset. Please note that you can apply a technique over an attribute (column) only once except character masking. Character masking can be used at most twice. **Explain** your anonymized dataset briefly, indicating which technique has been used over which attribute and how.

i) Attribute Suppression
ii) Character Masking
iii) Generalization
iv) Data Perturbation

b) Does your anonymized dataset satisfy the k-anonymity model? If yes, what is the value of k? Justify your answer. 5

c) Compare and contrast between 'Anonymization' and 'Pseudonymization.' 5

2. a) Explain the different types of threats to Information Systems. Comment briefly on the remedies to these threats. 4+4

b) Data encryption is the most popular way to secure your sensitive data. 3+6

Suppose Alice wants her friends to encrypt e-mail messages using a public-key encryption system before sending the e-mails to her. Assume that computers represent text as long numbers (01 for 'A,' 02 for 'B' and so on), so an e-mail message is just a very big number. Alice chooses the following set of values of p and q.

- For students with student id ends with an odd digit, p = 17 and q = 11.
- For students with student id ends with an even digit, p = 19 and q = 11.

Now answer the following questions.

i. Find the public key of Alice. The value of public exponent or e must be between 10 and 15 for odd-numbered students and between 15 and 20 for even-numbered students.

ii. Compute the private key of Alice based on the chosen public key. Show detail computation.

c) Explain the process of the PGP cryptosystem with appropriate figures. Comment on the significant advantage and disadvantages of PGP Encryption. 5+3

3. **Question 3.(a) is mandatory to answer. From the rest, answer any three.**

a) What do you understand by the term 'Personal Data'? Suppose you went to a coffee shop and paid the bill through your credit card. Do you consider the printed receipt of your credit card transaction as personal data? Please note that some of the digits of your credit card number are masked. Show proper reasonings in favor of your answer. 3+4

b) Do personal data protection laws apply to anonymous data according to EU GDPR? Explain your answer briefly, mentioning clause no. of GDPR in which this information is provided. Students can look into the EU GDPR Gazette attached with the submission link in Google Classroom to answer this question. 6

c) Mention the name of different Intellectual Property Rights. Suppose someone reveals your trade secret by reverse engineering and market analysis and use that knowledge for their goods. Can you take appropriate legal measures against that person or organization? Justify your answer and mention any assumptions if necessary. 6

d) Creative Commons License is one of the most popular public licenses. There are four "baseline rights" in CC licenses. What are those rights? 6
Suppose you have built an application and want to manage its copyright so that the other users can use the system, even they can modify it but cannot use it for any commercial purpose. Which type of CC license would you use?

e) Discuss the penalties of 'copyright infringement' according to Bangladesh Copyright Act 2000. Please include clause no. in your answer. Students can look into the Bangladesh Copyright Act 2000, which is attached with the submission link in Google Classroom, to answer this question. 6