Department of Computer Science

Second Semester Exams 2022/2023 Session

Course Code: CMP 404 EXAMS. **Course Title:** Software Engineering II

Time Allowed: 2hrs. **Instructions:** (Answer any 3 questions in not more than 4 lines)

1) a. What are the fundamental software engineering activities? *(5 marks)*

   b. What is the difference between software engineering and computer science? *(5 marks)*

   c. What differences has the web made to software engineering? *(5 marks)*

2) From the essential attributes of good software discuss:

   a. Maintainability *(5 marks)*

   b. Efficiency *(5 marks)*

   c. Acceptability *(5 marks)*

3) a. Mixing development with testing is known as what kind of development? *(5 marks)*

   b. What type of development was introduced as a part of extreme programming and plan-driven development? *(5 marks)*

   c. When the system is checked to see that changes made do not affect previously working code, we refer to this as …..? What development type is this used under? *(5 marks)*

4) a. What is the objective of release testing? *(5 marks)*

   b. Discuss stress testing explain what form of testing it comes under*(5 marks)*

   c. Illustrate the spiral model of development and evolution? *(5 marks)*

5) Discuss the following re-use levels:

   a. The Object level *(5 marks)*

   b. The Component level *(5 marks)*

   c. The System level *(5 marks)*

BINGHAM UNIVERSITY

FACULTY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

SECOND SEMESTER EXAMINATION, 2022/2023 SESSION

COURSE TITLE: INFORMATION SECURITY

COURSE CODE: CMP 408   **COURSE CREDIT UNITS:** 2

TIME ALLOWED: 2 HRS

INSTRUCTION: ANSWER QUESTION **ONE** AND ANY OTHER **TWO** QUESTIONS

1. (a) Assuming you work as a cloud engineer at your company and you manage the data hosted on your company's server in the night, an attacker was able to access your data base and insert some malicious records in your data base, so in the morning when you came, you ran your daily data verifications checks and you got an alarm that something has gone wrong, which pillar of CIA has been violated? (Explain your answer)

    (8 Marks)

    (b) When Bob initiates communication with Alice, a situation arises where Jackson hijacks the transmission and impersonates Alice. Could you illustrate possible event scenarios using a diagram?

    (8 Marks)

    (c) What are four essential security services that are typically necessary when making a purchase from amazon's e-commerce platform? Provide a justification for each service.

    (8 Marks)

    (d) Two business partners engage in a contract negotiation via email. Describe a scenario where one partner later denies agreeing to specific terms, highlighting the need for non-repudiation to resolve the dispute.

    (6 Marks)

2. (a) Two branches of a multinational corporation DBASE, need to establish a secure communication channel over an untrusted network. Describe a scenario where the branches must distribute encryption keys securely and explain the challenges they may face during the key distribution process.

    (8 Marks)

    (b) Prove $S=X_1^{A2} \bmod P = X_2^{A1} \bmod P = Y^{A1A2} \bmod P$

    (6 Marks)

    (c) A social media platform wants to store user passwords securely. Describe a scenario where the platform utilizes hashing to protect user passwords and explain the advantages of using hashing over other methods of password storage.

    (6 Marks)

3. (a) As a consultant hired to educate the staff of the Central Bank of Nigeria about the risks of unauthorized access, what key arguments would you present in favor of recommending the inclusion of lowercase, uppercase, numerals, and special characters in passwords? Alternatively, would you advise them to use only lowercase characters? Support your explanation with statistical evidence.

(7 Marks)

(b) Bingham Ventures utilizes an SQL database to store sensitive customer information, including personal details and financial data. Describe a scenario where SQL injection occurs, explain the potential consequences of this attack, and suggest preventive measures to mitigate the risk of SQL injection vulnerabilities in the company's database system.

(7 Marks)

(c) A spy agency needs to securely transmit a confidential message to its operative in the field. Describe a scenario where the agency decides to use a Caesar cipher encryption technique to protect the message. Explain how the Caesar cipher works, its limitations, and suggest additional cryptographic methods that could enhance the security of the message transmission.

(6 Marks)

4. (a) During the establishment of an SSL session, there are four stages that play a crucial role in maintaining a secure link for data transmission between communicating devices. What occurs if the user suspends the connection and attempts to resume data transmission at a later time? Please provide a diagrammatic illustration to support your answer.

(8 Marks)

(b) Differentiate between these authentication methods with examples

      (i)   Something I am

      (ii)   Something I posses

      (iii)   Something I know

(6 Marks)

(c) What properties must you consider when working with the RSA parameters n, e and d?

(6 Marks)

5. (a) Bingham University is considering the use of symmetric based authentication in curbing falsification of lecture attendance by students whereby, students sign on behalf of other students absent. The university management approaches your company for a solution. You are to present and justify your choice based on the three types of authentication narrowing your answer to a particular technology.

(8 Marks)

(b) In practice there is no universally trusted entity in the distribution of certificates. With the aid of a diagram, explain the process of distributing certificates and how domains are managed.

(8 Marks)

(c) Assume Alice and Bob want to exchange some messages with data integrity. Is hashing the message and sending the hash along with the message enough? Explain your answer.

(4 Marks)

COURSE CODE: CMP 416, COURSE TITTLE: Web Development Issues (Section A: Legal Aspect, Section B: Computer System Aspect) TIME ALLOWED: 2 Hours, INSTRUCTIONS: Attempt Only Two Questions under Section A and Two Questions under Section B.

SECTION A: **1.** Rehab Tanko, reincarnated as a neoclassical existentialist poet, gave a poetry recital at the ring your heart Concert Hall of the Bingham University arena for intellectual display (better known as "BUAID") On this occasion, she extemporized her poetry, a fancy way of saying she made it up on the spot. Mario ("The Memory") Martinez, a student with an exceptional memory, returned home afterwards and wrote down from memory one of Rehab Tanko's extemporized poems. He published it under the name "Conversations." Does Tabitha have a claim for copyright infringement against Mario? If yes, what will be your justification for the protection of intellectual property right.

2. "**We are sleepwalking into a surveillance society"** this was a statement attributed to Richard Thomas, UK Information Commissioner (Dec 2018) how true is this statement in the light of the massive threat to national security and the need to maintain an effective balance between the right to Privacy of person and property rights and the overall security of lives.

3. JoJo and Nikos are both employees of a large IT company, Orange Computers. JoJo is angry with Nikos regarding an argument they had earlier in the day and goes to Nikos' office to confront him. Upon arriving at Nikos' office JoJo realises that Nikos has left his computer logged in. JoJo sits down at Nikos' desk and opens and looks through several of the files saved on Nikos' computer. JoJo feels bad about this, as Nikos has always told him "You must never look through my computer, I will never give you permission to do this". Later, when JoJo gets home, he has calmed down and has forgiven Nikos for their argument. Instead, JoJo believes that his boss at Orange Computers is to blame for the argument. He decides, therefore, to send a large volume of emails to his boss's email address, which causes the server hosting this email address to crash. All email addresses hosted on the server become inoperative for a week as a result. Following this, JoJo sends Nikos an email apologising for their argument, but accidentally sends Nikos a virus which deletes all the contents of Nikos' computer. In relation to the above events, consider whether JoJo has committed any criminal offences under the Computer Misuse Act

SECTION B: 4. Department of computer science under Faculty of Science and Technology, Bingham University wanted you as a Computer Analyst and Web Designer to create a website for the Department, Mention Seven (7) Web Development Issues and briefly discuss possible solutions to the mentioned issues which would enable you create a good website.

5. Department of Chemical sciences under Faculty of Science and Technology, Bingham University wanted you as a Computer Analyst and Web Designer to create a website for the Department, Mention Five (5) Web Development Tools required for the design and briefly discuss each of the tools mentioned above which would enable you create a good website. Give one example each for the Five (5) web development tools.

6. Department of Biological sciences under Faculty of Science and Technology, Bingham University wanted you as a Computer Analyst and Web Designer to create a website for the Department, Mention Four basic area of website area and briefly discuss each of the areas mentioned above. List Five (5) reasons why we do structure a website.

COURSE CODE: CMP 410   **CREDIT UNIT: 2**

COURSE: DATA COMMUNICATION AN COMPUTER NETWORK   TIME: 3HRS

Instruction: Answer Question *ONE* and ANY other Three.

Q 1. NUC has just granted Bingham University approval for 13 additional programmes, which was included in the recent admission advertisement. The University envisages a tremendous increase in its student enrolment in the next academic and non-academic student.

In the light of this development, and being a proactive institution, the University has started physical development to cater for the increase in school population. The University Management also noted that the current school network infrastructure will not be adequate to meet the growing need of the University and wishes to deploy a new network for the school. Suppose you are engaged as a Network expert to redesign a new network for the University, what are the critical Network design consideration that you will take into accent for designing the new Network?

Q.2. A data Communication circuits is aimed to provide a transmission path between a sender and receiver and to transfer digital information from one station to another using electronic circuit.

With the aid of a diagram, discuss the major main component of data communication circuits.

Q3. With the advanced in technology and fast penetration of broadband Network of Nigeria. The Federal Government of Nigeria directed all Government Agencies to automate their operations and networked all their offices. Suppose an agency invited you as a graduate of computer Science student from Bingham University to advice on the Network requirements for the agency, what will you consider as the major network components for the Agency and explain their functions and features.

Q4. (a) What do you understand by the term "Network Protocol"

  (b)   List four Network protocols you know and discuss any two of them

Q5. (a) What is Data transfer rate?

(b) With the aid of diagram, explain three types of Data flows you know?

(C) A User want to upload a text document at the rate of 20 pages per 40 seconds.

 What will be the required Data rate of the channel? Assume that one page contains

160 characters and each is of 8 bites.

Q6. (a) Discuss the difference between circuits switching and packet switching.

(b) Assume that a voice channel occupies bandwidth of 4 KHz. We need to combine

     Three voice channels into a link with a bandwidth of 12 KHz from 40 to 52 KHz show the configuration, using the frequency domain. Assume there are no guard bands.