UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2022 – 3rd Year Examination – Semester 6

EN6106 – Emerging Topics in Information Technology

Multiple Choice Question Paper

(ONE HOUR)

Important Instructions:

- The duration of the paper is **1 (one) hour**.
- The medium of instruction and questions is English.
- The paper has **25 questions** and **seven (07) pages**.
- All questions are of the **MCQ** (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry **equal** marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet, which will be machine marked. Please thoroughly read and follow the instructions on the answer sheet's other side before you shade your correct choices.
- Calculators are **not** allowed.
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1) A monolithic architecture is the traditional model for software program design. What statement(s) best describes the *monolithic architecture* of a software system?

(a) All functionalities are implemented and deployed into a single software application.
(b) All functionalities are implemented separately but deployed into a single software application.
(c) All functionalities are implemented into a single application but deployed as separate software applications.
(d) Monolithic software application has many fine-grained and independent services
(e) Monolithic software applications use RESTful web services but are not supported for SOAP web services

2) What is/are benefit(s) of having a *monolithic software system*?

(a) Practice agile development and delivery methodologies
(b) Easy upgrading and adding new features
(c) Easy to scale
(d) Simplicity of having one code base
(e) Speedy development and deployment

3) Microservices refers to an architectural style for developing applications. What is/are the feature(s) of a *microservices* application?

(a) Single application as a suite of fine-grained and independent services
(b) Services can be developed and deployed independently
(c) Cannot be hosted on web servers
(d) Can be implemented using Spring Boot framework
(e) RESTful API can be used to connect frontend and backend microservices

4) One significant advantage of microservices is decentralized data management. What is/are the feature(s) of *Decentralized Data management* in Microservices?

(a) Each microservice can have a private database to persist the data that requires to implement the business functionality offered by it.
(b) In some business scenarios, you might have to update several databases for a single transaction.
(c) In a microservice application, it is impossible to configure a single database where tables are separated by clearly defined, logical boundaries and owned by specific services.
(d) Decentralized database management is the system in which all the data is stored and managed in a single unit.
(e) A given microservice can only access the dedicated private database but not the databases of other microservices.

5) Containers and virtual machines make your applications independent from your IT infrastructure resources. What is/are the correct statement(s) about *Virtual Machines (VMs) and Docker containers*?

(a) Each VM has an OS inside each VM, and it is called a host OS. Host OS can be any OS, like Linux or Windows.

(b) Docker containers host on a single physical server with a host OS, which shares among them. Sharing the host OS between containers makes them light and increases the boot time.
(c) Docker containers are suitable for running multiple applications over a single OS kernel. Virtual machines are needed if the applications or services run on different OS.
(d) Docker lets you separate your applications from your infrastructure to deliver software quickly.
(e) Virtual machines allow developers to build, test, and deploy code within simulated environments

6) *Data scientist* and *data engineer* are the two main professions in bigdata projects. What is/are the correct statements about data scientists and data engineers?

(a) Data scientist is operation focused while data engineer is business focused
(b) Data scientist analyses data and builds ML models while the data engineer provides data required for ML models
(c) Data scientists clean and prepare data while data engineers move data
(d) Data scientists require knowledge of mathematics, statistics, and computer science, while data engineers need knowledge of big data technologies and programming
(e) Data scientists create Extract - Transform - Load pipeline while data engineers produce insights and recommendations for improving the business

7) Python is a programming language widely used by Data Scientists. What are the *libraries* in Python that can be used in data analysis?

(a) Pandas
(b) Rqueue
(c) Numpy
(d) SciFi
(e) Simple Flat Mapper

8) *Data visualization* is the representation of data through the use of common graphics, such as charts, plots, infographics, and animations. What is/are the benefit(s) of data visualization?

(a) Identify outliers
(b) Easily understand casual relationships
(c) Visualize patterns
(d) Easy way to share information for non-technical audiences
(e) Data visualization tools show insights that may be missed in traditional reports

9) Several steps can be taken to use data science projects to *extract meaning from data*. Identify the important steps of this process.

(a) Data Cleaning
(b) Data Interpretation
(c) Data Modeling
(d) Data Serialization
(e) Data Plumbing

10) *Data pipelining tools* and solutions come in many forms, such as batch, cloud, and real-time. What is/are the common requirement(s) of these tools?

(a) Extract data from multiple relevant data sources
(b) Byzantine fault tolerance (BFT)
(c) Clean, alter, and enrich the data so it can be ready for analysis
(a) Load the data to a single source of information, usually a data lake or a data warehouse
(b) Exploratory data analysis

11) AI is focused on creating systems/machines with human-like thinking and reasoning abilities and bridging the gap between human intelligence and computational systems. What is/are examples of *AI paradigms* proposed to model AI systems/machines?

(a) Ontological
(b) Epistemological
(c) Bayesian
(d) Axiological
(e) Evolutionary

12) What can be considered as an example(s) for an *expert system*?

(a) SMTP Server
(b) FTP Server
(c) Version Control System
(d) Cancer Decision Support System
(e) Microsoft Project

13) Artificial Intelligence can be divided mainly into two types based on *capabilities*. They are *Strong AI* and *Weak AI*. Which of the following statement(s) is/are true?

I. In Strong AI, machines can solve complex problems like intelligent humans.
II. Weak AI, also known as narrow AI, focuses on performing a specific task
III. There are no real examples of strong AI because it is a hypothetical theory.

(a) Only I is correct
(b) I and II are correct
(c) Only II is correct
(d) II and III are correct
(e) I, II, and III are correct

14) Based on the *functionality*, AI can be classified into different types. Which of the following is/are *NOT* a type of AI?

(a) Reactive Machines
(b) Limited Memory
(c) Short-Term Memory
(d) Theory of Mind
(e) Self-Awareness

15) To obtain conclusions from data using artificial intelligence (AI), two commonly utilized approaches and *Rules-based AI* and *Machine Learning based AI*. In relation to those two approaches, which of the following statement(s) can be considered true?

I. Rules-based AI systems are suited for projects and applications that require small amounts of data and simple, straightforward rules.
II. Machine Learning based AI systems are commonly used when large volumes of relevant data records are available for making more accurate predictions.
III. There are some systems available that combine rules-based AI systems with ML systems

(a) Only I is correct
(b) I and II are correct
(c) Only II is correct
(d) II and III are correct
(e) I, II, and III are correct

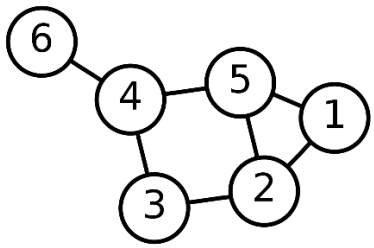
16) Social Networks can be represented mainly using *vertices* and *edges*. Which of the following statement(s) can be considered as false?

(a) Two vertices are adjacent if they are connected to each other through an edge
(b) An undirected edge is an ordered pair of nodes that can be represented graphically as an arrow drawn between the nodes.
(c) A directed edge disregards any sense of direction and treats both nodes interchangeably
(d) Out Degree is the number of edges leaving a vertex
(e) In degree is the number of edges entering a vertex

17) What are well-known *centrality measures* in Social Network Analysis?

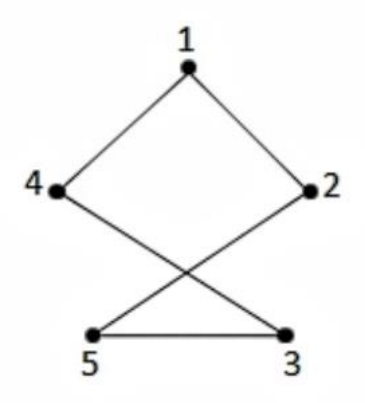
(a) Degree
(b) Betweenness
(c) Closeness
(d) Openness
(e) Eigenvector

18) What kind of data structure shows by the following figure?



(a) Undirected graph
(b) Directed graph
(c) Multigraph
(d) Complete Graph
(e) Singleton graph

19) Which *adjacency matrix* shows the correct representation of the following graph?



(a)

	1	2	3	4	5
1		1		1	
2	1				1
3				1	1
4	1		1		
5		1	1		

(b)

	1	2	3	4	5
1		1		1	
2	1				1
3		1			1
4	1		1		
5		1	1		

(c)

	1	2	3	4	5
1		1		1	
2				1	1
3		1			1
4	1		1		
5		1	1		

(d)

	1	2	3	4	5
1		1		1	
2	1				1
3		1			1
4	1		1		
5		1		1	

(e)

	1	2	3	4	5
1		1		1	
2	1				1
3		1			1
4	1				1
5		1	1		

20) *Data Management* in social network analysis is crucial for:

(a) Protecting sensitive information, adhering to ethical guidelines and regulations.
(b) Transparent documentation for sharing, collaboration, and replicability
(c) Structuring data coherently to analyze relationships in the network effectively
(d) Standardizing data, removing errors and duplicates, and ensuring trustworthy results
(e) To deal with potential biases like selection bias

21) *Forensic science* is made up of many specialized areas, including

(a) Forensic Psychology
(b) Forensic Chemistry
(c) Forensic Ontology
(d) Criminalistics
(e) Forensic Physics

22) Digital forensics is a branch of forensic science that focuses on identifying, acquiring, processing, analyzing, and reporting data stored electronically. What can be considered as the evidence gathered under Digital forensics?

(a) DNA tests
(b) Internet browser histories
(c) Metadata
(d) Ballistics
(e) Contents of computer memory

23) With digital evidence, investigators can quickly identify suspects, track their behaviours/movements, and gather evidence to support a prosecution. What are the roles of Digital Forensics in *Law Enforcement?*

(a) Digital Evidence Collection
(b) Fraud Investigations
(c) Cybercrime Investigations
(d) Private Investigations
(e) Terrorism Investigations

24) Digital forensic investigation is a process with set of phases. Identify the *phases* related to Digital forensic investigation from the list below.

(a) Identification
(b) Examination
(c) Digitalization
(d) Analysis
(e) Archiving

25) What statement(s) is/are true related to the *Chain of Custody?*

(a) A way to document the handling and movement of evidence in a digital forensics investigation
(b) Looks for patterns, connections, and other meaningful relationships to develop an understanding of the case
(c) Helps prevent tampering, contamination, or loss of evidence
(d) Starts when the evidence is first collected and ends when presented in court
(e) Use a variety of techniques to examine digital evidence, including specialized software tools and manual analysis

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