

COMPUTING FOR MEDICINE QUIZ-1

INSTRUCTIONS:

- Fill your credentials carefully.
- Total marks:30.
- Time: 45mins
- No of questions: 20

(1*17 = 17 marks)

1. In the context of reproducible research and data, FAIR stands for:

- a) Flexible, Authenticated, Interoperable, & Responsive
- b) Fair, Accessible Interoperable, & Reusable
- c) Findable, Accessible, Interoperable, & Reusable**
- d) Findable, Authenticated, Interactive, & Resource

2. _____ is the ability of two or more systems or components to exchange information and to use the information that has been exchanged.

- a) RESTful APIs
- b) **Interoperability**
- c) HL7 messages
- d) Reusability

3. Which of the following depicts the correct order of **increasing** complexity in data interoperability?

- a) Syntactic, Semantic, Process, Human**
- b) Semantic, Syntactic. Human, Process
- c) Human, Semantic, Syntactic, Process
- d) Human, Process, Semantic, Syntactic

4. You are working with data from ECG machines. Which standard is used to communicate such data?

- a) HL7**
- b) FAIR
- c) FHIR
- d) SNOMED

5. You are building a FHIR app aimed at primary health care services in villages in India and are working on the Patient FHIR resource. A_____ will help you constrain the Patient resource for the use case contexts of use and specify a variety of restrictions.

- a) Conformance resource
- b) Value Sets
- c) Ontology
- d) **Profile**

6. If there are 12 hospitals each implementing their own standards, what will be the number of inter-hospital mappings required to achieve interoperability?

- a) 144
- b) **66**
- c) 11
- d) 10

7. The feature of administrative discharge and billing in an EHR comes under which component of the meta-models?

- a) Organizational
- b) Information System
- c) **Functional**
- d) Data model

8. Which of the following is not true about HL7 Messages. These

- a) Are delimited by a pipe separator
- b) Are used primarily to exchange data between medical equipment
- c) **Can only have one segment per message transmitted**
- d) Can have numbers, text or symbols within the delimiting separators

9. Which of the following is not mandatory in a FHIR resource:-

- a) Identifier
- b) Human Readable Summary
- c) **Profile**
- d) A URL link

10. What is the purpose of the Patient resource in FHIR?

- a) To exchange information regarding procedures and surgeries for an individual receiving care or healthcare services
- b) To exchange information regarding orders and prescriptions of an individual receiving care or healthcare services
- c) **To exchange information regarding demographic and administrative information of an individual receiving care or healthcare services**
- d) All of the above

11. Which of the following is the first line of a HL7 syntax?

- a) Patient ID (PID)
- b) Admission Discharge Transfer (ADT)
- c) **Message Header (MSH)**
- d) Observation Segment (OBX)

12. Which of the following components of the FHIR structure identifies a FHIR system service.
i.e. a server that makes information available in conformance with the FHIR specification.

- a) Type
- b) Id
- c) **Base-address**
- d) URL

13. What is the first component of the ABDM FHIR stack that comes into role when a patient signs up on the app?

- a) Health Information Users (HIUs)
- b) Health Information Providers(HIPs)
- c) **Consent Manager (CMs)**
- d) Gateway

14. An ontology is represented as a

- a) Undirected Graph
- b) **Directed Graph without Cycles**
- c) Undirected Graph with Edge Weights
- d) Directed Graph with Cycles

15. Which term is used to describe a list of relevant terms pulled directly from a body of unstructured or semistructured text?

- a) Ontology
- b) Thesaurus
- c) Index**
- d) Terminology

16. Biomedical Ontologies are useful for designing clinical decision support system by providing

- a) **Computational graphs for querying parents and child terms of biomedical entities**
- b) Drugs information for treatment for diseases
- c) Synonyms, related terms and preferred terms biomedical entities
- d) Syntactic interoperability for structuring data

17. Which of the following is not true?

- a) Concepts are computational meanings that do not change.
- b) Each concept has at least one “is a” relationship.
- c) Relationship types in SNOMED CT are stored as concepts and have a SNOMED CT ID
- d) Post-coordinated SNOMED CT expressions use a single concept identifier is used to represent a clinical idea**

18. What is the difference between an Ontology and a Knowledge Graph? Provide a one line answer. (3 marks)

Ans:

An ontology refers to a generalized model that explains the relationship between two entities on a broader level based on common properties and not individuals whereas the knowledge graphs are data specific and help in establishing a link between the data points.

Knowledge Graph = Data + Ontology

19. Write briefly about ABDM frameworks for the emerging healthcare paradigm in India. (2 marks)

Ans:

Mission: To create a digital platform for evolving the health ecosystem through wide-range of data, information and infrastructure services while ensuring security, confidentiality and privacy. It has 3 milestones: M1,M2,M3. The stakeholders in the ABDM framework are as follows:

1. Patients
2. Health Professionals
3. Health Facilities
4. Digital Solution Companies

ABHA address: In order to manage the personal health records, users (patients) must first create an account on a HIE-CM (Health information exchange- Consent Manager), called their Ayushman Bharath Health Account (ABHA) address. This looks like computingformedicine@abdm. The @abdm tells us which HIE-CM is responsible for this address.

ABHA number: ABHA number is a *14-digit number* that is unique (only one per person) issued only after a strong KYC. Every ABHA number is automatically available as an ABHA address on the NHA HIE-CM like <14digitabhano>@abdm.

20. Explain the FHIR resources in one line with at least two examples each. (2*4= 8 marks)

Ans:

- a) Conformance: Resources describe how a system does or should work. Example: ValueSet, Conformance, StructureDefinition. (1+1)
- b) Administration: Resources to manage the administrative side of healthcare. Example: Patient, Order, OrderResponse. (1+1)
- c) Clinical: Clinical summaries, record keeping and planning. Example: Observation, Condition, CarePlan, AllergyIntolerance. (1+1)
- d) Financial: Resources that support financial services associated with the provision of healthcare. Example: Claim, Coverage, ExplanationOfBenefit. (1+1)