No. of Printed Pages : 4

MCS-219

MASTER OF COMPUTER APPLICATIONS (MCA) (NEW)

Term-End Examination

June, 2023

MCS-219 : OBJECT ORIENTED ANALYSIS AND DESIGN

Time : 3 Hours *Maximum Marks : 100*

Note : *(i) Question* ***No. 1*** *is compulsory and carries 40 marks.*

(ii) Attempt any ***three*** *questions from the rest.*

1. (a) An online admission system of a University provides facility to its prospective learner to apply for various UG and PG courses. During the application process applicants need to provide their basic details such as name, date of birth, mobile number, email-id and address. Also they need to upload

their certificates for which system provides proper instructions and interfaces. Subsequent upon processing the applications received, university displays the list of selected candidates and also send them email regarding their selection. Applicants pay the fee online and their id cards are generated. Draw the following diagrams for this system. (You can make necessary assumptions, if required) :

(i) Use case diagram 5

(ii) Class diagram 5

(iii) Sequence diagram 5

(iv) State diagram 5

(b) What is DFD ? Draw upto level 1 DFD for the system described in Q1(a) above. 10

(c) What is generalization ? Explain how generalization is different from aggregation with the help of class diagram for 'Computer System'. 10

2. (a) Explain the concepts of links and association with the help of example. Also, discuss how associations are implemented. 10

   (b) What is activity diagram ? Draw activity diagram for online shopping of mobile charger. 10

3. (a) What is deployment diagram ? What are components of deployment diagram ? Draw deployment diagram for "Online Admission System of a University". 10

   (b) What is object diagram ? Draw and explain object diagram for Saving Accounts in a Bank. 10

4. (a) What is concurrency control ? Explain need of concurrency control in a system with the help of an example. 10

   (b) Explain need of inheritance adjustment in designing of a system with the help of an example. 10

5. Write short notes on the following : 4×5=20

(a) Use of object ID

(b) Design Documentation

(c) Meta Data and Keys

(d) Basic philosophy of object orientation

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1. (a) "Object Oriented Analysis and Design is better than Structured Analysis and Design." Explain in detail. Justify the above statement. 10

(b) What is UML ? What are its advantages ? Draw class diagram for an ATM system. 10

(c) What is inheritance ? Explain advantages of inheritance. 5

(d) What is an association ? Explain use of link in representation of association with the help of a diagram. 5

(e) What is design documentation ? Briefly explain the features of a good design documentation. 5

(f) What is a functional model ? Which diagram is used in functional modeling ? Explain in brief. 5

2. (a) What is State Transition Diagram ? Draw State Transition Diagram for an ATM machine/system. 10

(b) What is Generalization ? How is it different from Specialization ? Explain with an example using suitable UML diagrams. 10

3. (a) What is a constraint ? Explain how constraints are shown in a class diagram. 5

(b) What is serialization ? Explain its use. 5

(c) Explain the difference between unidirectional and bidirectional association. Describe how bidirectional association is implemented. 10

4. (a) What is a component diagram ? What are its advantages ? Draw component diagram for ATM system. 10

(b) What is Aggregation ? Explain the use of aggregation in object oriented system design with the help of an example. 10

5. Write short notes on the following : 4×5=20

(a) Abstract class

(b) Use case Diagram

(c) Sequence Diagram

(d) Object Class and Database Tables

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Note : *Question No.* ***1*** *is compulsory. Attempt any* ***three*** *questions from the rest.*

1. (a) What is object oriented modeling ? List advantages of object oriented modeling. Explain various stages in object oriented modeling. 10

(b) What is a time-critical system ? Explain, how objects communicate in time-critical system. Also, explain the need of synchronization in time-critical system. 10

(c) What is persistent object ? How is it different from transient object ? 5

(d) What are derived attributes ? Discuss the role that they play in design-optimization ? 5

(e) What is association ? Explain one-to-one association with the help of a class diagram. Also, explain how it is implemented. 10

2. (a) What is collaboration diagram ? Explain, how methods are created from collaboration diagram with the help of an example. 10

(b) What is design-optimization ? Explain the tasks to be performed for design-optimization. 10

3. (a) Define abstraction. Explain, how abstraction results in modularity. Also, explain the need of inheritance adjustments in the design process. 10

(b) What is DFD ? Explain the advantages of using DFD. Draw 0-level and 1-level DFD's for online examination system. Make necessary assumptions. 10

4. (a) What is dynamic model ? Explain the use of dynamic model with the help of suitable diagrams. 10

(b) What is use case diagram ? Explain various components of use case diagram. Draw a use case diagram for online examination system. Make necessary assumptions. 10

5. Write short notes on the following : 4×5=20

   (a) Aggregation

   (b) Integrity constraints

   (c) Implementation of controls

   (d) Object model

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1. (a) Explain basic principles used in OOAD. How do these principles add flexibility, maintainability and extensibility to the software ? 10

(b) Categorize the following into class, objects, generalization, aggregation/association, inheritance and explain briefly about your choices : 10

(i) Book

(ii) Book-Author

(iii) Printer

(iv) Student–MCA student

(v) Computer–Monitor

(c) What is state diagram ? Write components of a state diagram. Draw state diagram for Online Examination System. 10

(d) What is association ? What are different types of association ? Explain with the help of examples using UML diagrams. 10

2. (a) Draw DFDs upto level 2 for Online Examination System. Make necessary assumptions. 10

(b) Draw class diagrams for Online Examination System. Make necessary assumptions. 10

3. (a) What is use-case diagram ? Write the objectives of use-case diagram. Describe elements of use-case diagram with the help of an example. 10

(b) What is system design ? Explain the primary tasks performed during the system design phase. 10

4. (a) What is concurrency ? Explain with an example. Also, explain the need of concurrency management. 5

(b) What is design optimization ? Explain its need. 5

(c) What is serialization ? Where is it used, and why ? 5

(d) Explain how the object classes are mapped to database tables. 5

5. Write short notes on the following : 4×5=20

   (a) Cohesion and coupling

   (b) Dynamic Model

   (c) Synchronous and asynchronous data flow in DFDs

   (d) Immutable Association

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1. (a) What is OOAD ? Briefly explain the advantages of OOAD. 8

(b) What is abstraction in OOAD ? Explain why abstraction is used. Illustrate with the help of an example. 8

(c) What is UML ? Draw hierarchy of UML-diagrams. 8

(d) What is inheritance ? Explain the basic rules (semantic rules) for inheritance. 8

(e) What is one-to-one association ? Explain with an example. Also, explain how one-to-one associations are implemented. 8

2. (a) What is object modeling ? What is the output of object modeling ? Explain how an object diagram is created with the help of an example. 10

(b) What is a use-case diagram ? Where can we use use-case diagrams ? Explain include dependency in use-case with the help of an example. 10

3. (a) Explain an event, state and transition in context of state diagram with the help of an example. 10

(b) What is the basic purpose of drawing a component diagram ? Draw component diagram for online Banking System and explain it. Make necessary assumptions. 10

4. (a) What is DFD ? Draw DFDs upto 2nd level for Online Banking System. Also, briefly explain the meaning of balancing a DFD. 10

(b) What is the need of a design documentation ? What are different types of it ? Also, explain features of a good design document. 10

5. Write short notes on the following : 4×5=20

(a) Collaboration diagram

(b) Data Persistence

(c) Mapping object classes to tables

(d) Class Diagram

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