

PART A

Answer to all Questions

10 x 2 marks = 20 marks

1. Design a use case diagram of “withdrawing Money from ATM” Scenario and get a concurrent message from the bank with 3 types of actors.
2. Develop sequence diagram for “Rhyme App” to school children that narrates chosen English rhymes then translates its meaning automatically towards NLP using google translator and finally stored in a google drive.
3. Identify Domain classes, Analysis classes, Potential classes, Design classes of “online Food ordering system”
4. Build the design pattern template.
5. Find the online, offline collaborators of the following to the Online Hospital Management System: HomePage, DBAdmin, Patients, Doctors, Receptionist, TokenNo, Visitors, Camera, medicines, prescription_report, Scan_report, XRay_machine and draw collabom diagram
6. Find architectural style of the following:
 - a. Mobile phone recharge system by multiple **clients**, ISP
 - b. Online exam system through **centralized Question repository** for JEE exam.
 - c. Binary **pipeline** search of Not-available element
 - d. Component, Package, Modules, program, instruction and data design
7. Why does a good software design must exhibits firmness, commodity, delight? Justify.
8. What are the design issues of UI design and design models of it?

9. Find correct terms and Match the following architectural genre:

Artificial Intelligence - Netflix

Commercial – Alexa

Communication - cricInfo

Sports - telegram

10. What is the need for refactoring?

PART-B

Answer any three Questions:

3 x 10 marks = 30 marks

11. a. Explain all Design principles, b. Elaborate all types of coupling and cohesion of component level design. (5+5 marks)
12. Explain all OO concepts and Fundamental design concepts with example (5+5 marks)
13. Explain all UI principles.
14. Explain the components (5marks) of Conversion process of “analysis to design model” with suitable pyramid picture. (5marks)

PART A

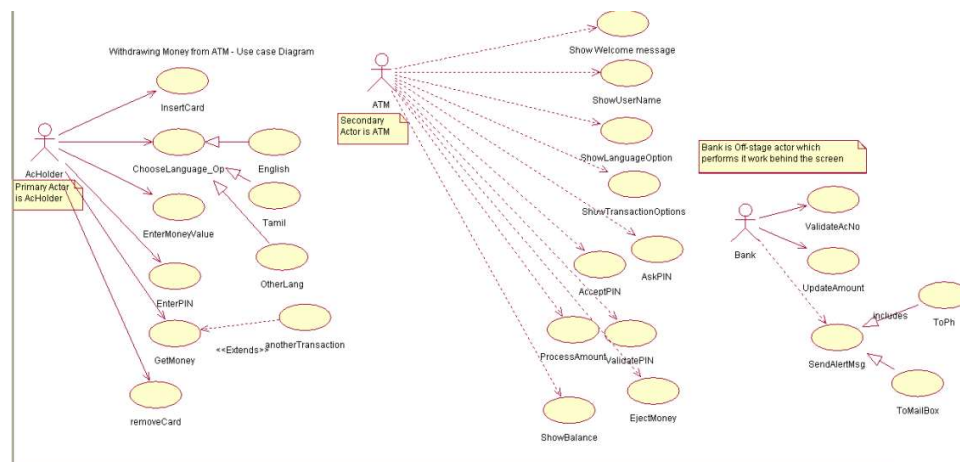
Q.No	Questions	CO	RBT Level
1	Design a use case diagram of “withdrawing Money from ATM” Scenario and get a concurrent message from the bank with 3 types of actors.	CO3	L5
2	Develop sequence diagram for “Rhyme app” to school children that narrates chosen English rhymes then translates its meaning automatically towards NLP using google translator and finally stored in a google drive.	CO3	L5
3	Identify Domain classes, Analysis classes, Potential classes, Design classes of “online Food ordering system”	CO1	L2
4	Build the design pattern template.	CO4	L2
5	Find the online, offline collaborators of the following to the Online Hospital Management System: HomePage, DBAdmin, Patients, Doctors, Receptionist, TokenNo, Visitors, Camera, medicines, prescription_report, Scan_report, XRay_machine and draw collaboration diagram	CO1	L2

6	Find architectural style of the following: a. Mobile phone recharge system by multiple clients, ISP b. Online exam system through centralized Question repository for JEE exam. c. Binary pipeline search of Not-available element d. Component, Package, Modules, program, instruction and data design	CO1	L2
7	Why does a good software design must exhibits firmness, commodity, delight? Justify.	CO2	L5
8	What are the design issues of UI design and design models of it?	CO1	L2
9	Match the following: Artificial Intelligence - Netflix Commercial – Alexa Communication - cricInfo Sports - telegram	CO2	L3
10	What is the need for refactoring?	CO1	L2
	Part-B		
11	a.Explain all Design principles (5 marks) b.Elaborate all types of coupling and cohesion of	CO1	L2

	component level design(5marks)		
12	Explain all OO concepts and Fundamental design concepts with example(5+5)	CO1	L2
13	Explain all UI principles.	CO1	L2
14	Explain the components (5marks) of Conversion process of “analysis to design model” with suitable pyramid picture.	CO1	L2

Answer Key

- Design a use case diagram of “withdrawing Money from ATM”
Scenario and get a concurrent message from the bank with 3 types of actors.



Primary actor: AccountHolder

Secondary: ATM, ATM card, PIN

Off-stage: Bank, , camera

Use cases of ATM

WelcomeMsg(),

InsertATMcard(),

ShowUserName(),

ShowLanguage(),

chooseOption() has withdrawMoney(), BalanceEnquiry(),

ChangePIN(), Deposit(), FundTransfer(),

withdrawMoney() includes enterAmt()-50s(),500s(),1000s(),

DropMoney(), cancel()

EnterPIN() extends WrongPIN() depends EjectATM()

WantToPrintReceipt(), DisplayBalance(), EjectATM()

Use cases of AccountHolder:

EnterATM

pushATMcard

chooseLanguage

SelectOptions

typePIN

verifyPIN

getMoney

pullATMcard

Use cases of ATMcard:

readCard(), DisplayLED(), DisplayDetails(), verifyPIN(),

EjectCard()

Use cases of Bank:

checkAcNumber()

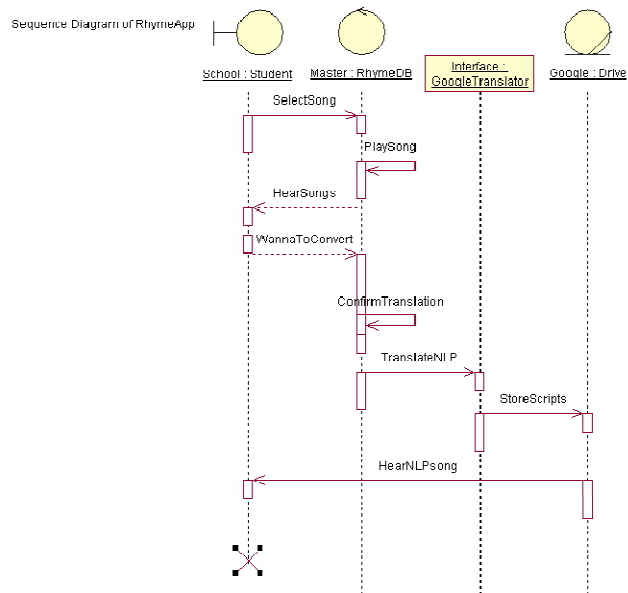
UpdatePassBook()

sendAlertMsgToPh()

prepareStatement()

Use cases of Camera: watch(), footage(), save()

- Develop sequence diagram “Rhyme App” for school children that sing chosen English rhymes then translates its meaning automatically towards NLP using google translator and finally stored in a google drive. (BCE classes, symbols&messages)



- Identify Domain classes, Analysis classes, Potential classes, Design classes of “online Food ordering system”.

Domain classes: HOTEL, Foodie, MenuCard, deliveryBoy, chef, cooks, server, manager, orders, delivery, payment, GPS, address, ph, email, rawVeg, DeliveryBox, rating, tips, feedback

Analysis classes: Hotel, Foodie, MenuCard, deliveryBoy, orders, payment, GPS, address, ph, email, rating, tips, feedback

Potential Classes: Hotel, Foodie, MenuCard, orders, Payment

Design class: HotelDB, FoodieDB, MenuList, OrderDB, PaymentMode

B: Foodie – Home PageInterface

C: Admin – confirm/cancel button UI

E: Bank, DeliveryDetails – get(), delete(), Post() methods

- Build the design pattern template.

Design Pattern Template Pattern name—describes the essence of the pattern in a short but expressive name Intent—describes the pattern and what it does Also-known-as—lists any synonyms for the pattern Motivation—provides an example of the problem Applicability—notes specific design situations in which the pattern is applicable Structure—describes the classes that are required to

implement the pattern Participants—describes the responsibilities of the classes that are required to implement the pattern Collaborations—describes how the participants collaborate to carry out their responsibilities Consequences—describes the “design forces” that affect the pattern and the potential trade-offs that must be considered when the pattern is implemented Related patterns—cross-references related design patterns

- Find the online, offline collaborators of the following to the Online Hospital Management System: HomePage, DBAdmin, Patients, Doctors, Receptionist, TokenNo, Visitors, Camera, medicines, prescription_report, Scan_report, XRay_machine and draw collaboration diagram.

Offline: Doctor, Patient, visitor, receptionist, XRay_machine, medicines, Prescription_report, camera

Online: DoctorDB, PatientDB, cameraFootage, Scan_report, TokenNo

- Find architectural style of the following:
 - Mobile phone recharge system by multiple **clients**, ISP
Client-Server Model
 - Online exam system through **centralized** Question **repository** for JEE exam. – **Data repository Model**
 - Binary search of Not-available element – **Pipeline/hierarchical Model**
 - Component, Package, Modules, program, instruction and data design – **Layered Model**
- Why does a good software design must exhibits firmness, commodity, delight? Justify.
Bcos, Good software design should exhibit: Firmness: A program should not have any bugs that inhibit its function. Commodity: A program should be suitable for the purposes for which it was intended. Delight: The experience of using the program should be pleasurable one, to reuse the design again.
- What are the design issues of UI design and design models of it?

Design Issues Response time Help facilities Error handling
Menu and command labeling Application accessibility
Internationalization,
UI design Models are: user model, design model, system
perceptive mental model, implementation model

9. Find correct terms and Match the following architectural genre:

Artificial Intelligence - Alexa

Commercial – Netflix

Communication - Telegram

Sports - cricInfo

10. What is the need for refactoring?

redundancy unused design elements inefficient or unnecessary
algorithms poorly constructed or inappropriate data structures or
any other design failure that can be corrected to yield a better
design.

PART-B

Answer any three Questions:

3 x 10 marks = 30 marks

11. Explain all Design principles,

The design process should not suffer from ‘tunnel vision.’ The design should be traceable to the analysis model. The design should not reinvent the wheel. The design should “minimize the intellectual distance” [DAV95] between the software and the problem as it exists in the real world. The design should exhibit uniformity and integration. The design should be structured to accommodate change. The design should be structured to degrade gently, even when aberrant data, events, or operating conditions are encountered. Design is not coding, coding is not design. The design should be assessed for quality as it is being created, not after the fact. The design should be reviewed to minimize conceptual (semantic) errors.

12. Explain all OO concepts(5 marks) and fundamental design concepts with example (5 marks),

OO design concepts—object,class,inheritance, polymorphism, data encapsulation

Abstraction—data, procedure, control Architecture—the overall structure of the software Patterns—”conveys the essence” of a proven design solution Separation of concerns—any complex problem can be more easily handled if it is subdivided into pieces Modularity—compartmentalization of data and function Hiding—controlled interfaces Functional independence—single-minded function and low coupling Refinement—elaboration of detail for all abstractions Aspects—a mechanism for understanding how global requirements affect design Refactoring—a reorganization technique that simplifies the design Design Classes—provide design detail that will enable analysis classes to be implemented

13. Explain all UI principles

Anticipation—A WebApp should be designed so that it anticipates the use’s next move. Communication—The interface should communicate the status of any activity initiated by the user Consistency—The use of navigation controls, menus, icons, and aesthetics (e.g., color, shape, layout) Controlled autonomy—The interface should facilitate user movement throughout the WebApp, but it should do so in a manner that enforces navigation conventions that have been established for the application. Efficiency—The design of the WebApp and its interface should optimize the user’s work efficiency, not the efficiency of the Web engineer who designs and builds it or the client-server environment that executes it.

Focus—The WebApp interface (and the content it presents) should stay focused on the user task(s) at hand. Fitt’s Law—“The time to acquire a target is a function of the distance to and size of the target.” Human interface objects—A vast library of reusable human interface objects has been developed for WebApps. Latency reduction—The WebApp should use multi-tasking in a

way that lets the user proceed with work as if the operation has been completed. Learnability— A WebApp interface should be designed to minimize learning time, and once learned, to minimize relearning required when the WebApp is revisited.

Maintain work product integrity—A work product (e.g., a form completed by the user, a user specified list) must be automatically saved so that it will not be lost if an error occurs. Readability—All information presented through the interface should be readable by young and old.

Track state—When appropriate, the state of the user interaction should be tracked and stored so that a user can logoff and return later to pick up where she left off. Visible navigation—A well-designed WebApp interface provides “the illusion that users are in the same place, with the work brought to them.”, Modularity, Information hiding, high cohesion, low coupling, separation of concerns, Information experts

14. Explain the components of Conversion process of “analysis to design model” with suitable pyramid picture. (5pic.+5expla.)

Analysis Model -> Design Model

