



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

COMPUTER SCIENCE AND ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	DESIGN PATTERNS
Course Code	:	A70530 (JNTUH - R15)
Class	:	IV B. Tech I Semester
Branch	:	Computer Science and Engineering
Year	:	2018 – 2019
Course Faculty	:	Mr. C. Praveen Kumar, Assistant Professor, CSE Mr. R.M. Noorullah, Associate Professor, CSE Mr. M. Rakesh, Assistant Professor, CSE Ms. J. Hareesha, Assistant Professor, CSE

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

S. No	Question	Blooms Taxonomy Level	Course Outcome
UNIT – I			
INTRODUCTION:WHAT IS A DESIGN PATTERN			
PART – A (SHORT ANSWER QUESTIONS)			
1.	Define design pattern.	Remember	2
2.	List the four elements of design patterns.	Remember	1
3.	Distinguish a class and an object.	Understand	1
4.	Give an example for class structure.	Remember	2
5.	Sketch MVC architecture.	Understand	2
6.	State the meaning of a solution.	Remember	1
7.	Write the different sections of design patterns.	Understand	3
8.	Give the meaning of Intent.	Understand	4
9.	List the four essential elements of design pattern	Remember	2

10.	Describe catalog of design patterns	Remember	2
11.	Define the two categories on which design pattern depends	Remember	2
12.	Explain how design patterns solve design problems	Understand	4
13.	Differentiate Inheritance and composite	Understand	2
14.	Explain how to select a design pattern	Understand	3
15.	List out the patterns used in design patterns	Remember	2
PART – B (LONG ANSWER QUESTIONS)			
1.	List the advantages of design patterns. Write short notes on use of design patterns	Remember	2
2.	Discuss the MVC architecture in small talk.	Understand	1
3.	Describe design patterns	Understand	1
4.	Mention different sections of design patterns. Explain about them.	Understand	2
5.	Name the patterns along with their intents that are included in the catalog of design patterns.	Remember	2
6.	State and explain the classification of design patterns	Remember	1
7.	List the various ways of organizing the design patterns	Remember	3
8.	Compare inheritance verses parameterized types	Understand	4
9.	Explain the Design patterns relationships	Understand	2
10.	Compare run-time and compile-time structure	Understand	2
11.	List the common causes for redesigning of design patterns	Remember	2
12.	Explain the Frameworks in detail	Remember	4
13.	Write about the role of Toolkit in designing pattern	Understand	2
14.	Significance of Delegation in design pattern	Understand	3
15.	Explain the Catalogs of design patterns	Understand	2
PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1.	A reputed software company is developing CAD software. It is required that the software should read licenses details, number of simultaneous users, permitted features etc., from configuration file with a specific syntax. Design the software with suitable design pattern and explain with a class diagram. Briefly discuss the consequences and implementation issues.	Understand	2
2.	Discuss the following aspects of behavioral patterns briefly: Should communication be encapsulated or distributed, Decoupling senders and receivers	Remember	1
3.	Write about documentation and learning Aid Alexander’s pattern languages	Remember	1
4.	Write the code for connecting two objects by applying suitable design pattern	Understand	2
5.	Explain about which optimization technique is used to hide the data from client	Understand	2
6.	Distinguish between inheritance and composition	Understand	1
7.	What is the use of object diagram in modeling? Explain	Remember	3
8.	Explain the step - by - step approach for selecting the design pattern	Remember	4
9.	Explain the compile time structure of a object oriented program	Understand	2

10.	List and explain the reusable object oriented design aspects of a pattern	Understand	2
UNIT – II			
A CASE STUDY: DESIGNING A DOCUMENT EDITOR			
PART – A (SHORT ANSWER QUESTIONS)			
1.	Give the meaning of “WYSIWYG”.	Remember	5
2.	Define Lexi.	Remember	6
3.	Describe an abstract class	Understand	6
4.	Elaborate meaning of a document	Understand	7
5.	Differentiate compositor and composition	Understand	5
6.	Define formatting	Remember	7
7.	Describe an Iterator class	Remember	8
8.	Define creational patterns	Understand	5
9.	Define abstract factory design pattern	Understand	6
10.	Elaborate builder pattern	Understand	7
11.	Give example of class diagram	Remember	5
12.	Define structure and applicability of abstract factory method	Remember	5
13.	Describe User operations	Understand	7
14.	Define Prototype design pattern	Understand	5
15.	Pattern is used when we want to pass data with multiple attributes in one shot from client to server?	Understand	5
16.	Which of the following is the correct list of entities of Transfer Object pattern?	Remember	6
17.	What are the correct about Factory design pattern?	Remember	5
18.	Pattern is primarily used to reduce the number of objects created and to decrease memory footprint and increase performance?	Understand	6
19.	In which of the pattern, an abstract class exposes defined way(s)/template(s) to execute its methods?	Remember	5
20.	What is the difference between an adapter and a decorator?	Understand	6
PART – B (LONG ANSWER QUESTIONS)			
1.	Explain the process of recursive composition in building a document.	Understand	5
2.	Describe in detail about the ‘Glyph’ abstract class	Remember	6
3.	Discuss the goals and constraints in choosing an internal representation for a document.	Remember	6
4.	Explain partial Glyph class hierarchy with a neat diagram	Understand	7
5.	Explain composition and compositor class relationship with a neat diagram	Understand	5
6.	Explain the interaction diagram with example.	Understand	7
7.	Explain about abstracting object creation in detail.	Understand	8
8.	Memorize the useful techniques for implementing the abstract factory pattern.	Understand	5
9.	Write sample code for abstract factory design pattern	Remember	6
10.	Explain the implementation of abstract factory	Understand	7

11.	Discuss about structure, applicability, participants of abstract factory method	Understand	5
12.	Discuss the implementation issues of builder design pattern	Understand	5
13.	Explain the structure of builder design pattern with class diagram and describe the collaboration with a sequence diagram.	Remember	7
14.	Describe in detail about how Multiple Window Systems is supported	Understand	5
PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1.	Evaluate how design patterns can solve the design problems of a document editor	Understand	5
2.	Discuss in detail about the representation of a document structure	Understand	6
3.	Significance of creational patterns in design of particular pattern?	Understand	6
4.	Draw and explain the structure of abstract factory and also	Remember	7
5.	Explain the various participants involved in it.	Remember	5
6.	Explain the role of formatting in creation of a document editor	Remember	7
7.	Describe liabilities and techniques for implementing the abstract factory pattern? Explain them.	Understand	8
8.	Draw and explain the interaction diagram that illustrates the cooperation between a builder and director	Understand	5
9.	Mention different criteria that select the right pattern for a given problem?	Remember	6
10.	Describe the relationship between different participants present in prototype pattern?	Understand	7
11.	Explain the importance of Look-and-Feel standards in design of a document	Remember	5
UNIT – III STRUCTURAL PATTERN			
PART – A (SHORT ANSWER QUESTIONS)			
1.	Define structural patterns.	Understand	8
2.	List different types of structural patterns	Understand	10
3.	Discuss the role of participants.	Remember	10
4.	Define bridge pattern	Remember	9
5.	List five types of creational patterns.	Understand	11
6.	Describe Intent and Consequences of bridge pattern	Understand	10
7.	Sketch the structure of composite pattern	Understand	9
8.	Describe decorator pattern	Understand	8
9.	Mention use of decorator pattern	Remember	10
10.	Sketch the structure of decorator pattern	Understand	11
11.	List the benefits of decorator pattern	Remember	9
12.	Define Façade pattern	Understand	10
13.	Sketch the structure of Façade pattern	Understand	11
14.	Describe composite pattern	Understand	8
15.	Define Proxy pattern	Remember	8

PART – B (LONG ANSWER QUESTIONS)			
1.	Describe the intent, motivation and applications of composite patterns	Understand	8
2.	Discuss the importance of implementation in composite structural pattern	Understand	10
3.	Give the intent, applicability and structure of composite design pattern and explain it	Understand	10
4.	Draw the structure of composite pattern with a class diagram.	Understand	9
5.	Describe the consequences of composite design pattern	Understand	11
6.	Elaborate composite pattern with an example from drawing editor.	Understand	10
7.	Describe the structure of decorator pattern with suitable example.	Remember	9
8.	Mention the motivation for decorator method with relevant patterns.	Understand	8
9.	Explain the structure of decorator design pattern with a class diagram	Understand	10
10.	Explain the structure of façade design pattern with class diagram and consequences	Understand	11
11.	Mention the consequences of flyweight method with its structure.	Understand	9
12.	Explain structure of flyweight pattern with suitable example	Understand	10
13.	Draw the structure of decorator design pattern with a class diagram	Remember	11
14.	Explain the structure of Proxy design pattern with a class diagram.	Understand	8
15.	Draw the structure of Adapter design pattern with class diagram and consequences	Understand	8
PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1.	Explain the significance of proxy patterns with a suitable example.	Remember	8
2.	Mention the applicability and collaborations of a adapter pattern.	Understand	10
3.	Describe how to decouple the abstraction from implementation.	Understand	10
4.	Implementation issues of a flyweight patterns.	Understand	9
5.	Explain the role of creational patterns in design of the pattern.	Understand	11
6.	Distinguish between abstract class and concrete class	Understand	10
7.	Explain the role of interaction diagrams in design patterns	Remember	9
8.	Mention different issues to be considered while applying the decorator pattern?	Understand	8
9.	What relation exists between the different participants involved in composite pattern? Explain it in detail	Remember	10
10.	Draw and explain the multiple inheritance interface that illustrates relation between different participants in the adapter pattern.		
UNIT – IV BEHAVIORAL PATTERNS			
PART – A (SHORT ANSWER QUESTIONS)			
1.	Describe behavioral pattern.	Understand	12

2.	Explain behavioral class pattern	Understand	13
3.	Define behavioral object pattern	Remember	11
4.	Describe command pattern	Understand	12
5.	Describe command pattern	Remember	12
6.	Sketch sequence diagram for any example pattern	Understand	13
7.	Sketch the structure of server in election commission.	Understand	11
8.	Write the intentions of mediator pattern	Understand	12
9.	Define mediator pattern	Remember	13
10.	Sketch the structure of mediator pattern	Understand	13
11.	Write about Chain of Responsibility	Remember	12
12.	Define Memento pattern	Understand	11
13.	Describe Observer pattern	Understand	13
14.	Define Iterator pattern	Understand	13
15	Sketch the structure and applicability of Observer pattern	Remember	11
PART – B (LONG ANSWER QUESTIONS)			
1.	Mention uses of command design pattern and its structure	Remember	12
2.	Define composite design pattern	Understand	13
3.	Explain the implementation and consequences of command pattern.	Understand	11
4.	Elaborate implementation issues of command pattern with sample code.	Understand	12
5.	Describe the collaborations and consequences of command method.	Remember	12
6.	Explain the interpreter design pattern and discuss the consequences and implementation issues.	Remember	13
7.	Discuss the implementation issues of Iterator.	Understand	11
8.	Explain the structure of mediator design pattern with a class diagram and discuss the collaboration with a sequence diagram.	Understand	12
9.	Discuss about intent, motivation, structure, applicability and consequences of a mediator behavioral pattern	Understand	13
10.	Explain the participants, collaborations, implementation and sample code of the mediator pattern	Understand	13
11.	Mention known uses of memento method	Remember	12
12.	Explain the uses of Chain of Responsibility design pattern and its structure with class diagram. Also explain the implementation issues.	Understand	11
13.	Evaluate Observer design pattern and discuss the consequences and implementation issues.	Understand	13
14.	Discuss the consequences and implementation issues of memento design pattern.	Understand	13
15	Explain the uses of Iterator design pattern and its structure with class diagram	Understand	11
16	Explain the known uses of Observer method	Understand	12

PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1.	List and explain the various constructors and functions present in Iterator and list-Iterator	Understand	12
2.	What are the issues to be considered when designing the chain of responsibility pattern?	Remember	13
3.	List and explain the variants and alternatives of Iterator pattern.	Understand	11
4.	What is the motivation for mediator pattern? Explain	Remember	12
5.	Define an Iterator? Explain the various operations that an Iterator supports. Explain them in detail	Remember	12
6.	List and explain the variants and alternatives of Iterator pattern	Understand	13
7.	Give brief description about the command history.	Understand	11
8.	List and explain the various participants involved in design of the interpreter	Understand	12
9.	Explain Double Dispatch and Single Dispatch for behavioral design pattern	Understand	13
10.	What are the two models used in behavioral pattern?	Understand	13
UNIT – V			
BEHAVIORAL PATTERNS-II			
PART – A (SHORT ANSWER QUESTIONS)			
1.	Mention the intent of memento pattern	Understand	14
2.	Define the phrase “objects for states”.	Understand	14
3.	Describe state pattern	Remember	16
4.	Sketch the structure of state pattern	Understand	14
5.	List the situations where state pattern can be used	Understand	16
6.	Define table driven approach	Understand	15
7.	Write the sample code for Strategy pattern	Understand	14
8.	Elaborate about the collaborations of Visitor pattern	Remember	15
9.	Explain about the consequences of Template pattern	Remember	15
10.	Write about the Pattern community	Understand	14
11.	Explain about the patterns in software	Understand	16
12.	Write about the lifecycle of Object Oriented Software	Understand	16
13.	Explain how objects are used as arguments	Remember	15
14.	Describe double-dispatch and single-dispatch	Understand	14
PART – B (LONG ANSWER QUESTIONS)			
1.	Mention the implementation issues of Strategy design pattern.	Understand	14
2.	Explain the implementation issues of observer design pattern.	Understand	14
3.	Describe how design patterns affect the way object-oriented software is designed	Remember	16
4.	Discuss the several ways the design pattern affect the way object-oriented software is designed.	Remember	14
5.	Describe design patterns as a supplement to the existing methods.	Understand	16
6.	Discuss the history of design patterns	Understand	15
7.	Differentiate Alexander’s patterns and Design patterns	Understand	14

8.	Write about the two ways of grouping the patterns according to Christopher Alexander.	Remember	15
9.	Compare and contrast between Abstract Class vs Concrete Class	Understand	15
10.	Discuss about Alexander's pattern languages	Understand	14
11.	Describe a briefly history of design patterns	Understand	16
12.	Mention consequences and implementation issues of Visitor design pattern	Understand	16
13.	Discuss about intent, motivation, structure, applicability and consequences of a Template Method behavioral pattern	Remember	15
14.	Explain the State design pattern and discuss the consequences and implementation issues	Understand	14
15	Write the sample code for Template method and Visitor patterns	Understand	15
PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)			
1.	Discuss with suitable scenarios, how state, strategy and visitor patterns can solve design problems	Remember	14
2.	What to except from design pattern	Remember	14
3.	Explain the importance of object diagram in modeling, With the help of a suitable example	Understand	16
4.	Describe a template? In which way a design pattern will be described. Explain in detail	Understand	14
5.	Mention common causes for redesign a design pattern	Understand	16
6.	Explain the role of behavioral patterns in design of the patterns	Understand	15
7.	Elaborate key idea of state pattern? Explain it in detail.	Understand	14
8.	Explain Documentation, Learning –Aid and An Adjunct to existing systems in detail. “Should Communication encapsulated or distributed”	Understand	15
9.	Explain Decoupling senders and receivers	Remember	15
10.	Elaborate about intent, motivation, structure, applicability and consequences of a Template Method behavioral pattern	Understand	14

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