CMR ENGINEERING COLLEGE
UGC AUTONOMOUS
(Approved by AICTE - New Delhi. Affiliated to JNTUH and Accredited by NAAC & NBA)
Kandlakoya (V), Medchal (M), Medchal - Malkajgiri (D)-501401

COURSE INSTRUCTOR NAME: Ms.M.Saimanasa   ACADEMIC YEAR:2023-24

SUBJECT NAME:DESIGN PATTERNS

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CONTACT NO:7032621212

SEM START DATE AND END DATE: 4-12-23 T0 27-03-24

CONTENTS OF COURSE FILE:

1. Department vision & mission

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HOD

1. DEPARTMENT VISION & MISSION

Vision:

To produce globally competent and industry-ready graduates in Computer Science & Engineering by imparting quality education with the know-how of cutting-edge technology and holistic personality.

Mission:

1. To offer high-quality education in Computer Science & Engineering in order to build core competence for the graduates by laying a solid foundation in Applied Mathematics and program frameworkwith a focus on concept building.

2. The department promotes excellence in teaching, research, and collaborative activities to prepare graduates for a professional career or higher studies.

3. Creating an intellectual environment for developing logical skills and problem-solving strategies, thus developing, an able and proficient computer engineer to compete in the current global scenario.

2. LIST OF PEOs, POs AND PSOs

2.1 Program Educational Objectives (PEO):

PEO 1: Excel in professional career and higher education by acquiring knowledge of mathematical computing and engineering principles.

PEO 2: To provide an intellectual environment for analyzing and designing computing systems for technical needs.

PEO 3: Exhibit professionalism to adapt current trends using lifelong learning with legal and ethical responsibilities.

PEO 4: To produce responsible graduates with effective communication skills and multidisciplinary practices to serve society and preserve the environment.

2.2. Program Outcomes (POs):

Engineering Graduates will be able to satisfy these NBA graduate attributes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive

clear instructions

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

2.3 Program Specific Outcomes (PSOs):

PSO1: Professional Skills and Foundations of Software development: Ability to analyze, design and develop applications by adopting the dynamic nature of Software developments.

PSO2: Applications of Computing and Research Ability: Ability to use knowledge in cutting edge technologies in identifying research gaps and to render solutions with innovative ideas.

3. List of COs (Action verbs as per Bloom's Taxonomy)

CO1.**Understand** design patterns in software applications

CO2. **Discuss** the creational patterns.

CO3. **Implement** the structural patterns.

CO4. Investigate Behavioral pattern.

CO5. **Construct** the good design patterns structure.

4. SYLLABUS COPY

UNITI:I

Introduction: What Is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNITII:

Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, and Supporting Multiple Look–and-Feel Standards, Supporting Multiple Window Systems ,User Operations Spelling Checking and Hyphenation, Summary.

UNITIII:

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNITIV:

Structural Pattern: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

UNITV:

Behavioral Patterns: Chain of Responsibility, Command, interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor.

TEXT BOOK:

Design Patterns by Erich Gamma, Pearson Education

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5. INDIVIDUAL TIME TABLE (M.Saimanasa)

	I	II	III	IV	V	VI	VII
MON		DP(IV-B)					
TUE			DP(IV-B)			DP(IV-B)	
WED	DP(IV-B)			DP(IV-B)		DP(IV-B)	
THU							
FRI							
SAT							

6. SESSION PLAN/LESSON PLAN

S.NO	Topic	Sub-Topic	NO. OF LECTURES REQUIRED	Suggested Books	Teaching Methods	Dates
		UNIT – I				
1		Introduction of Design Patterns	**L1**	T1,R1	**M1**	**04/12/23**
2		What is a design pattern?	**L2, L3**	T1	**M1**	**04/12/23, 05/12/24**
3		Design patterns in Smalltalk MVC	**L4, L5**	T1,R1	**M4**	**06/12/23, 11/12/24**
4	**Introduction**	Describing Design Patterns	**L6, L7**	T1	**M1**	**11/12/23, 12/12/24**
5		The Catalog of Design Patterns	**L8**	T1	**M4**	**12/12/23**
6		Organizing the Catalog	**L9**	T1	**M4**	**13/12/23**

7		How Design Patterns Solve Design Problems	**L10**	T1	**M1**	**18/12/23**
8		How to Select a Design Pattern	**L11**	T1	**M1**	**19/12/23**
9		How to use Design patterns	**L12**	T1	**M1**	**19/12/23**
10	**Completion of Unit I**					

<table>
<tr><td colspan="7" align="center">UNIT – II</td></tr>
<tr><td>11</td><td rowspan="9"><u>Designing a Document Editor</u></td><td>Introduction</td><td>L13</td><td>T1</td><td>M1</td><td>20/12/23</td></tr>
<tr><td>12</td><td>Design Problems</td><td>L14</td><td>T1</td><td>M1</td><td>20/12/23</td></tr>
<tr><td>13</td><td>Document Structure</td><td>L15, L16</td><td>T1,R1</td><td>M1</td><td>26/12/23, 27/12/24</td></tr>
<tr><td>14</td><td>Formatting</td><td>L17, L18</td><td>T1</td><td>M1</td><td>27/12/23, 02/01/24</td></tr>
<tr><td>15</td><td>Embellishing the user Interface</td><td>L19</td><td>T1</td><td>M1</td><td>02/01/23</td></tr>
<tr><td>16</td><td>Supporting Multiple Look-and Feel Standards</td><td>L20, L21</td><td>T1,R1</td><td>M4</td><td>03/01/23, 08/01/24</td></tr>
<tr><td>17</td><td>Supporting Multiple Window Systems,</td><td>L22, L23</td><td>T1</td><td>M1</td><td>08/01/24, 09/01/24</td></tr>
<tr><td>18</td><td>User Operations Spelling Checking and Hyphenation</td><td>L23, L24</td><td>T1</td><td>M1</td><td>09/01/24, 13/01/24</td></tr>
<tr><td>19</td><td>Summary</td><td>L25</td><td>T1</td><td>M1</td><td>13/01/24</td></tr>
<tr><td>20</td><td colspan="6" align="center">Completion of Unit II</td></tr>
<tr><td colspan="7" align="center">UNIT – III</td></tr>
<tr><td>21</td><td></td><td>Creational Patterns introduction</td><td>L26</td><td>T1</td><td>M1</td><td>13/01/24</td></tr>
</table>

22	**Creational Patterns**	Abstract Factory , Builder	**L27, L28**	T1	**M1**	**17/01/24 , 22/01/24**
23		Factory Method, Prototype,	**L29, L30**	T1,R1	**M4**	**23/01/24 , 24/01/24**
24		Singleton, Discussion of Creational Patterns	**L31, L32**	T1,R1	**M4**	**05/02/24 , 06/02/24**
25	**Completion of Unit III**					
	UNIT – IV					
26	**Structura l Patterns**	Structural Patterns Introduction	**L33**	T1	**M1**	**12/02/24**
27		Adapter , Bridge	**L34, L35**	T1	**M4**	**13/02/24 , 14/02/24**
28		Composite, Decorator	**L36, L37**	T1	**M1**	**19/02/24 , 20/02/24**
29		Façade, Flyweight	**L38, L39**	T1	**M4**	**21/02/24 , 26/02/24**
30		Proxy	**L40, L41**	T1,R1	**M1**	**27/02/24 , 28/02/24**
31	**Completion of Unit IV**					
	UNIT –V					
32	**Behaviora l Patterns**	Introduction	**L42, L43**	T1,R1	**M1**	**28/02/24 , 05/03/24**
33		Chain of Responsibility ,Command	**L44, L45**	T1,R1	**M1**	**06/03/24 , 11/03/24**
34		Interpreter, Iterator	**L46. L47**	T1	**M1**	**12/03/24 , 13/03/24**
35		Mediator, Memento	**L48, L49,**	T1	**M4**	**18/03/24 , 19/03/24**
36		Observer , State	**L50,L51**	T1	**M1**	**19/03/24 ,**

						20/03/24
37		Strategy, Template Method	**L52, 53**	T1	**M1**	**20/03/24**, **26/03/24**
38		Vistor	**L54**	T1	**M4**	**26/03/24**
39		**Completion of Unit V**				

METHODS OF TEACHING:

M1 : Lecture Method	**M4 : Presentation /PPT**	**M7 : Assignment**
M2 : DemoMethod	**M5 : Lab/Practical**	**M8 : Industry Visit**
M3 : Guest Lecture	**M6 : Tutorial**	**M9 : Project Based**

NOTE:
1. AnySubjectinaSemesterissupposetobecompletedin55to65periods.
2. Each Period is of 50minutes.
3. Each unit duration &completion should be mentiond inthe Remarks Column.
4. ListofSuggestedbookscanbemarkedwithCodeslikeT1, T2, R1, R2etc.

7. Session Execution Log:

S no	Units	Scheduled started date	Completed date	Remarks
1	I	4/12/2023	19/12/2023	**Completed**
2	II	20/1/2024	13/01/2023	**Completed**
3	III	13/1/2023	07/2/2023	**Completed**
4	IV	12/2/2023	27/2/2023	**Completed**
5	V	28/2/2023	26/3/2023	**Completed**

8. Lecture Notes (Hand written)

9. Assignment Questions Along Sample Assignment Scripts

ASSIGNMENT -I

DESIGN PATTERNS
IV B.TECH II SEM
Academic year 2023-24

1(a) Describe Design patterns?   **(CO1)**

(b) Mention Common Causes for redesigning of design pattern**?**   **(CO1)**

2(a) Discuss the MVC architecture in Small talk?   **(CO1)**

(b) Explain Organizing the catalog of design pattern?   **(CO1)**

3(a) Elaborate in detail about the Glyph abstract class?   **(CO2)**

(b) Discuss about Lexi's user interface and its design problem?   **(CO2)**

4 Explain in detail about "supporting multiple window System"?   **(CO2)**

5. Explain about the Intent, known uses and Related patterns and structure of Abstract factory

and Builder?   **(CO2)**

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ASSIGNMENT -II

DESIGN PATTERNS

IV B.TECH II SEM

Academic year 2023-24

1. a) List and explain the implementation issues of factory method?   **(CO3)**

b) Give brief description about the singleton creational pattern?   **(CO3)**

2. a) What is the motivation for the flyweight pattern? Explain in detail?   **(CO4)**

b) Mention the consequences and implementation issues of the façade design pattern?   **(CO3)**

3. What is Decorator Design pattern? Explain with example?   **(CO4)**

4. a) Explain memento design pattern?   **(CO5)**

b) Explain mediator design pattern?   **(CO5)**

5. Explain in detail about the visitor object behavioral pattern?   **(CO5)**

10. MID EXAM QUESTION PAPER ALONG SAMPLE ANSWER SCRIPTS

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Note: Question paper contains two parts, Part - A and Part - B.

Part-A is compulsory which carries 10 marks. Answer all questions in part-A.

Part-B consists of ($2_{1/2}$) units. Answer any one full question from each unit. Each question carries 5 marks and may have a, b, c sub questions.

PART-A   5X2=10

1. What is Gang of Four GOF?   (CO1)
2. Explain briefly about "Monoglyph"?   (CO2)
3. Write about document structure?   (CO2)
4. Describe the motivation for Bridge Pattern?   (CO3)
5. Draw the structure Abstract Factory?   (CO3)

PART-B   3X5=15

6a. Discuss the MVC architecture in small talk?   (CO1)

b. Explain the Organizing the catalogue of Design Pattern?   (CO1)

(OR)

7a. Describe Design patterns?   (CO1)

b. Mention common causes for redesigning of design patterns?   (CO1)

8a. Discuss about Lexi's user interface and its design Problem?   (CO2)

b. Explain in detail about "Supporting Multiple Window system"?   (CO2)

(OR)

9a. Elaborate in detail about the 'Glyph' abstract class?   (CO2)

b. Discuss about Lexi's user interface and its design Problem?   (CO2)

10. Discuss about implementation issues of Abstract Factory Design Pattern?   (CO3)

(OR)

11. Explain about Intent, Known Uses Related Patterns and structure of Abstract Factory and Builder?

(CO3)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV.B.TECH- II-SEM MID-II EXAMINATION   **Date: 28/03/2024**   **Time: 01:30-03:00 PM**
Subject: DESIGN PATTERNS (CS853PE)
Branch: CSE   **Section: B&D**   **Marks: 25 M**

Note: Question paper contains two parts, Part - A and Part - B.

Part-A is compulsory which carries 10 marks. Answer all questions in part-A.

Part-B consists of (2½) units. Answer any one full question from each unit. Each question carries 5 marks and may have a, b, c sub questions.

PART-A   5X2=10

1. Explain intent and structure of Prototype?   (CO3)
2. Explain Consequence and Related Pattern of Adapter Pattern?   (CO4)
3. What is basic problem being solved by Bridge Pattern?   (CO4)
4. List the Implementation issues of Factory Method?   (CO5)
5. Write about Applicability of State Pattern?   (CO5)

PART-B   3X5=15

6. Explain abstract Factory Method design pattern?   (CO3)
                              (OR)
7. a) Explain the role of creational patterns in design of a pattern? (CO3)
   b) Give brief description about the singleton creational pattern?   (CO3)

8. a) What is the motivation for the flyweight pattern? Explain in detail? (CO4)
   b) Mention the consequences and implementation issues of the façade design pattern?(CO4)
                              (OR)
9. What is Decorator Design pattern? Explain with example?   (CO4)

10. a)Write a short note on Chain of responsibility?   (CO5)
    b) Explain mediator design pattern?   (CO5)
                              (OR)
11. Explain in detail about the visitor object behavioral pattern?   (CO5)

11. SCHEME OF EVALUATION

MID-I SCHEME OF EVALUATION

PART-A

S.NO	THEORY	MARKS	TOTAL
1	What is Gang of Four GOF? (CO1)	2	2
2	Explain briefly about "Monoglyph"?(CO2)	2	2
3	Write about document structure?(CO2)	2	2
4	Describe the motivation for Bridge Pattern?(CO3)	2	2
5	Draw the structure Abstract Factory?(CO3)	2	2

PART-B

S.NO	THEORY	MARKS	TOTAL
6	a.Discuss the MVC architecture in small talk? (CO1)	2.5	
	b. Explain the Organizing the catalogue of Design Pattern? (CO1)	2.5	5
7	a.Describe Design patterns?	2.5	
	b .Mention common causes for redesigning of design patterns? (CO1)	2.5	5
8	a. Discuss about Lexi's user interface and its design Problem? (CO2)	2.5	
	b. Explain in detail about "Supporting Multiple Window system"? (CO2)	2.5	5

9	a. Elaborate in detail about the 'Glyph' abstract class? (CO2)	2.5	
	b. Discuss about Lexi's user interface and its design Problem? (CO2)	2.5	5
10	Discuss about implementation issues of Abstract Factory Design Pattern? (CO3)	5	5
11	Explain about Intent, Known Uses Related Patterns and structure of Abstract Factory and Builder? (CO3)	5	5

MID-II SCHEME OF EVALUATION

PART-A

S.NO	THEORY	MARKS	TOTAL
1	Explain intent and structure of Prototype? (CO3)	2	2
2	Explain Consequence and Related Pattern of Adapter Pattern? (CO4)	2	2
3	What is basic problem being solved by Bridge Pattern?(CO4)	2	2
4	List the Implementation issues of Factory Method? (CO5)	2	2
5	Write about Applicability of State Pattern?(CO5)	2	2

PART-B

S.NO	THEORY	MARKS	TOTAL
6	Explain abstract Factory Method design pattern? (CO3)	5	5
7	a) Explain the role of creational patterns in design of a pattern (CO3)	2.5	5
	b) Give brief description about the singleton creational pattern?(CO3)	2.5	
8	a) What is the motivation for the flyweight pattern? Explain in detail? (CO4)	2.5	5
	b) Mention the consequences and implementation issues of the façade design pattern?(CO4)	2.5	
9	What is Decorator Design pattern? Explain with example?(CO4)	5	5
10	a)Write a short note on Chain of responsibility? (CO5)	2.5	5
	b)Explain mediator design pattern?(CO5)	2.5	
11	Explain in detail about the visitor object behavioral pattern? (CO5)	5	5

12. Mapping of COs with POs and PSOs

Course Outcomes	Relationship of Course Outcomes (CO) to Program Outcomes (PO)													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-		-	-	3	1	-	2	-	-	1	1	-
CO2	-	3	3	2	3	-	-	-	-	-	-	2	-	-
CO3	-	3	3	-	2	1	-	2	-	-	-	-	3	3
CO4	-	-	-	-	-	-	3	-	-	3	3	-	-	-
CO5	1	-	-	-	-	2	-	-	1	-	2	-	3	3

13. COs, POs, PSOs Justification

CO1.**Understand** design patterns in software applications

CO2. **Discuss** the creational patterns.

CO3. **Implement** the structural patterns.

CO4.**Investigate** Behavioral pattern.

CO5.**Construct** the good design patterns structure.

CO1: **Understand** design patterns in software applications

	Justification
PO1	**Correlated with PO1 strongly** because the student's able to know the design patterns in software applications. So, overall the correlation of CO1 to PO1 is good.
PO6	**Correlated with PO6 strongly** because Students will able to know how to construct design pattern structure. So, overall the correlation of CO1 to PO6 is good.
PO7	**Correlated with PO7 low** because Students will be able to learn t he design patterns to interpret real world problems. So, overall the correlation of CO1 to PO7 is low.
PO9	**Correlated with PO9 is moderately** students able to Understanding design patterns in software applications contributes significantly to the program outcome of "Individual and team work So, overall the correlation of CO1 to PO9 is moderate
PO12	**Correlated with PO12 is low** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change" So, overall the correlation of CO1 to PO12 is low
PSO1	**Correlated with PSO1 is low** because Students are able to analyze, design and develop the applications by adopting the various python platform execution environments. So, overall the correlation of CO1 to PSO1 is low .

CO2: **Discuss** the creational patterns.

	Justification
PO2	**Correlated with PO2 strongly** Discussing creational design patterns directly contributes to the program outcome of "Problem analysis" by fostering a deep understanding of problem domains and providing structured approaches to addressing software design challenges. . So, overall the correlation of CO2 to PO2 is good.
PO3	**Correlated with PO3 strongly** The course outcome of discussing creational patterns directly justifies the program outcome of "Design/development of solutions" by providing students with the knowledge and skills necessary to create well-designed, scalable, and maintainable software

	solutions.. So, overall the correlation of CO2 to PO3 is good.
PO4	**Correlated with PO4 moderately** Discussing creational patterns justifies the program outcome of "Conduct investigations of complex problems" by providing students with the analytical skills and tools necessary to dissect and understand complex software design challenges. So, overall the correlation of CO2 to PO4 is moderate
PO5	**Correlated with PO5 is moderately** by providing students with the knowledge and skills necessary to effectively utilize modern software design tools and methodologies... So, overall the correlation of CO2 to PO5 is good
PO12	**Correlated with PO12 is moderately** by fostering a mindset of continual improvement and adaptation in the field of software engineering. So, overall the correlation of CO2 to PO12 is moderate

CO 3: **Implement** the structural patterns

	Justification
PO2	**Correlated with PO1 strongly** by equipping students with the skills and knowledge necessary to dissect and understand complex software design challenges. .. So, overall the correlation of CO3 to PO2 is good
PO3	**Correlated with PO2 strongly** because Students will be able to design the patterns to develop simple systems So, overall the correlation of CO3 to PO3 is good .
PO5	**Correlated with PO4 moderately** because Students will be able to design the solutions to solve the problems related to. So, overall the correlation of CO3 to PO4 is moderate .
PO6	**Correlated with PO5** by equipping students with practical skills in utilizing modern software development tools effectively. So, overall the correlation of CO3 to PO5 is low .
PO8	**Correlated with PO8 is moderately** The implementation of structural patterns in a course can justify the program outcome of "Ethics" by instilling ethical considerations in software design and development practices. So, overall the correlation of CO23 to PO8 is moderate
PSO1	**Correlated with PSO1 is strongly** Implementing structural patterns in a course aligns with the program-specific outcomes of "Professional Skills" and "Foundations of Software Development" by providing students with practical skills and foundational knowledge essential for success in the software development industry. So, overall the correlation of CO3 to PSO1 is good .
PSO2	**Correlated with PSO2 is strongly** Implementing structural patterns in a course aligns with the program-specific outcomes of "Applications of Computing" and "Research Ability" by providing students with practical skills and fostering a research-oriented mindset So, overall the correlation of CO3 to PSO2 is good .

CO 4: Investigate Behavioral pattern.

	Justification
PO7	**Correlated with PO1 strongly** because Students will be able to apply patterns concept in the design patterns. So, overall the correlation of CO4 to PO7 is good.
PO10	**Correlated with PO10 strongly** because Students will be able to design the solutions for different problems related to design pattern Concept. So, overall the correlation of CO4 to PO10 is good.
PO11	**Correlated with PO11 strongly** because Students will be able to design the solutions to various problems. So, overall the correlation of CO3 to PO11 is good.

CO 5: Construct the good design patterns structure.

	Justification
PO1	**Correlated with PO3 low** because Students will be able to know good design pattern structure by applying the knowledge modeling techniques So, overall the correlation of CO5 to PO1 is low .
PO6	**Correlated with PO5 is moderately** because students will be able to apply the concept of object-oriented modeling So, overall the correlation of CO5 to PO6 is moderate.
PO9	**Correlated with PO9 is low** because Students will be able to do any work effectively in any environment. So, overall the correlation of CO5 to PO9 is low .
PO11	**Correlated with PO11 is moderately** The course outcome of constructing a good design patterns structure can justify the program outcome of "Project management and finance" by contributing to effective project planning, resource management, and risk mitigation So, overall the correlation of CO5 to PO11 is moderate
PSO1	**Correlated with PSO1 strongly** by providing students with essential skills and foundational knowledge in software engineering. mitigation So, overall the correlation of CO5 to PSO1 is good
PSO2	**Correlated with PSO2 strongly** by providing students with practical skills and fostering a research-oriented mindset in the field of computing. So, overall the correlation of CO5 to PSO2 is good

14.Attainment of COs, POs and PSOs (Excel Sheet)

15. Previous Year Question Paper

Code No: 117CF

Time: 3 Hours   M:

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in
consists of 5 Units. Answer any one full question from each unit.
carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

1.a)	Describe about pattern name.	[2]
b)	What do you mean by consequences?	[3]
c)	Write about document structure.	[2]
d)	Explain briefly about "Monoglyph".	[3]
e)	Describe the motivation for Bridge Pattern.	[2]
f)	What are all the Participants for Proxy Pattern?	[3]
g)	What are the Consequences of Chain of Responsibility Pattern.	[2]
h)	Write the Pattern name and Classification of Observer Pattern.	[3]
i)	What can we expect from a Design Pattern?	[2]
j)	Write about Applicability of State Pattern.	[3]

Part-B (50 Marks)

2.a)   How to use design patterns? Explain in detail.
  b)   Explain about selection of a design pattern.

OR

3.   How a Design pattern solves the design problem? Illustrate with an e

4.   Discuss the Motivation, Structure, Collaborations and Implementatio
Patterns:
a) Abstract Factory   b) Prototype.

OR

5.   Explain in detail about "supporting multiple window systems".

6.   Discuss the Intent, Applicability, Sample code, and Known us
Patterns:
a) Adapter   b) Flyweight
OR

7.   Discuss the pattern name, Applicability, Consequences and Rel
following Patterns
a) Bridge   b) Proxy

Code No: 117CF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYD
B. Tech IV Year I Semester Examinations, November/December -
DESIGN PATTERNS
(Common to CSE, IT)

Time: 3 Hours

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questio
Part B consists of 5 Units. Answer any one full question from ea
question carries 10 marks and may have a, b, c as sub questions.

PART- A

1.a)   What is Gang of Four *GOF*?
  b)   How to select a design pattern?
  c)   How many objects is the Singleton responsible for creating?
  d)   What are the consequences of the Abstract Factory pattern?
  e)   What is the basic problem being solved by the Bridge pattern?
  f)   What are the two variations of the Adapter pattern?
  g)   What is the intent of mediator pattern?
  h)   What are the consequences of Chain of Responsibility pattern?
  i)   What is Template method pattern?
  j)   What is the purpose of Visitor pattern?

PART-B

2.a)   What are the different ways in which patterns and frameworks share
        in which they differ? Discuss.
  b)   Describe the consistent format for describing the design patterns.
                                OR
3.a)   Give the step-by-step approach to apply a design pattern effectively.
  b)   What is the basis for classifying design patterns? Categorize and tal
        patterns.

4.a)   Discuss about Lexi's user interface and its design problems.
  b)   The Singleton uses a special method to instantiate objects. What is s
        method?
                                OR
5.a)   What are the implementation issues of prototype design pattern? Discuss
  b)   Can we use an abstract factory for supporting multiple window system
        Explain.

6.a)   Discuss in detail about the participants and consequences of Composite
  b)   What is the intent and motivation of Façade pattern? Explain.
                                OR

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, December - 2014
DESIGN PATTERNS
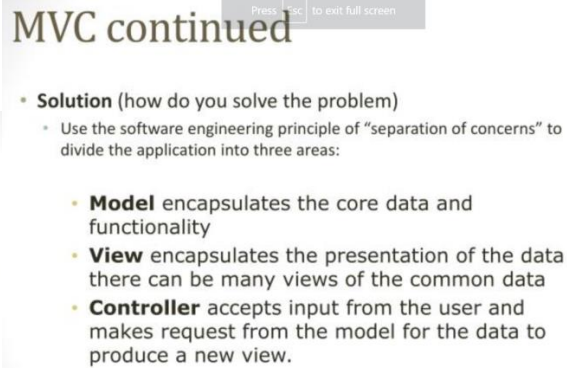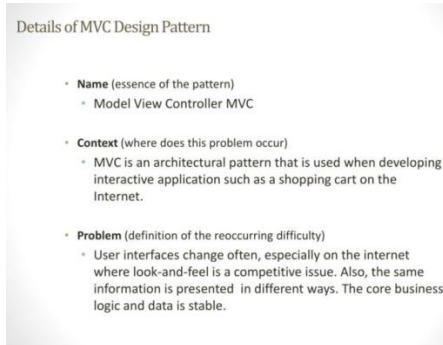(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

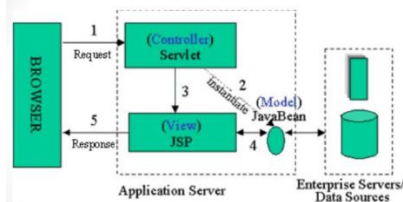**Answer any Five Questions**
All Questions Carry Equal Marks
- - -

1.a) What is a Design Pattern? What is the role of Design Pattern in software industry?
 b) Define MVC. What are the advantages of MVC?
 c) Give a brief note on organizing the catalog of the Design Pattern.

2.a) Explain Recursive Composition with a neat diagram.
 b) Define a widget. What is difference between Glyph and Monoglyph? Explain.
 c) Write short notes on spell-checking and Hyphenation.

3.a) Explain the Motivation of Abstract Factory with an example.
 b) What are the key consequences of Builder Design Pattern? Explain.
 c) Draw the Structure of Factory Method Design Pattern. List the participants of Factory Method and explain.

4.a) Draw the structure of Adapter Design Pattern. List the participants of Adapter Design Pattern and explain.
 b) List the implementation issues of Bridge Design Pattern and explain.
 c) Briefly explain Structural Design Pattern along with its advantages.

5. Explain Decorator Design Pattern in detail.

6.a) What is the Intent of Chain of Responsibility Design Pattern? What are the uses of Chain of Responsibility Design Pattern?
 b) Explain the collaborations of Command Design Pattern with a neat diagram.

7. Explain Observer Design Pattern in detail.

8.a) What are the similarities and differences between Patterns and Framework?
 b) Write short notes on Pattern Community.

--ooOoo--

16. Power Point Presentation PPTs

MVC continued

Details of MVC Design Pattern

- **Name** (essence of the pattern)
  - Model View Controller MVC

- **Context** (where does this problem occur)
  - MVC is an architectural pattern that is used when developing interactive application such as a shopping cart on the Internet.

- **Problem** (definition of the reoccurring difficulty)
  - User interfaces change often, especially on the internet where look-and-feel is a competitive issue. Also, the same information is presented in different ways. The core business logic and data is stable.

- **Solution** (how do you solve the problem)
  - Use the software engineering principle of "separation of concerns" to divide the application into three areas:

    - **Model** encapsulates the core data and functionality
    - **View** encapsulates the presentation of the data there can be many views of the common data
    - **Controller** accepts input from the user and makes request from the model for the data to produce a new view.

MVC Structure for J2EE

MVC Architecture

- The **Model** represents the structure of the data in the application, as well as application-specific operations on those data.

- A **View** (of which there may be many) presents data in some form to a user, in the context of some application function.

- A **Controller** translates user actions (mouse motions, keystrokes, words spoken, etc.) and user input into application function calls on the model, and selects the appropriate View based on user preferences and Model state.

Design Patterns Space

		Purpose		
		Creational	Structural	Behavioral
Scope	Class	Factory Method	Adapter	Interpreter Template
	Object	Abstract Factory Builder Prototype Singleton	Adapter Bridge Composite Decorator Façade Flyweight Proxy	Chain of Responsibility Command Iterator Mediator Memento Observer State Strategy Visitor
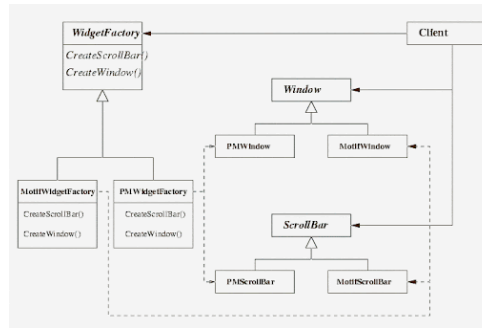
2.6 Supporting Multiple Window System

A platform's window system creates the illusion of multiple overlapping windows on a bitmapped display.

We'd like Lexi to run on as many of them as possible for exactly the same reasons we support multiple look-and-feel standards.

Singleton Pattern

Pattern Name: Singleton Pattern

Context

We want to ensure there is only **one instance of a class**.
All parts of the application should share this single instance.

Motivation (Forces)

Several objects need to access the same resource, or we want objects to share a resource that is "expensive". Many parts of the program need to access this shared resource.

Solution

Prevent direct instantiation by making the constructor private.

Provide a static accessor method that always returns the same instance of this class (same object).

Singleton Pattern

Singleton has 3 elements:

(1) private static attribute that is the only instance of this class

(2) constructor is private to prevent other classes from creating objects

(3) public static accessor returns the single instance of this class.

Singleton
- instance: Singleton
<<constructor>>
- Singleton( )
+ getInstance( ) : Singleton
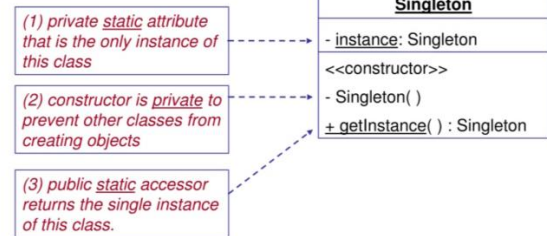
Intent

- Adapt an existing class rather than modify for reuse:
  - Convert interface of a useful class into another interface clients expect
- Also known as the wrapper design pattern; it wraps existing functionality of an adaptee with an adapter's inherited interface.
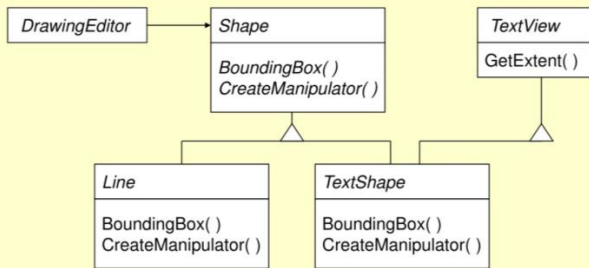
Participants

- Target
  - defines the interface that the Client will use.
- Client
  - creates and interacts with objects which conform to the target interface.
- Adaptee
  - has an interface that needs adapting.
- Adapter
  - adapts the interface of the adaptee to that of the target.

Intent

- Decouple an abstraction from its implementation so that the two can vary independently

- Allows different implementations of an interface to be decided upon dynamically.

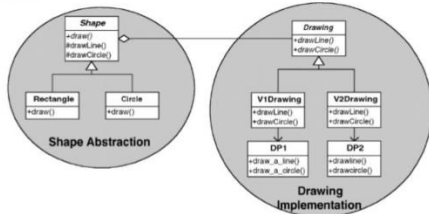- Also known as Handle/Body pattern

Participants

- Abstraction
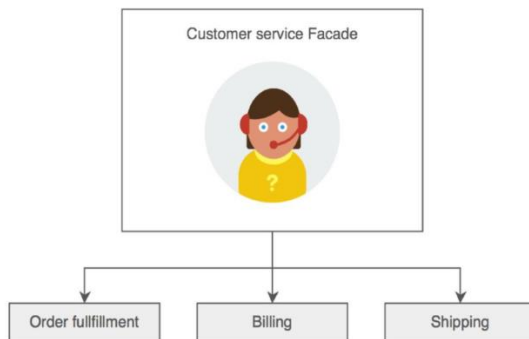- Refined abstraction
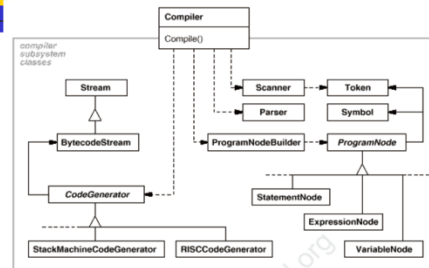- Concrete implementor
- Implementor

Structure

Solution using Bridge

client classes

Facade

subsystem classes
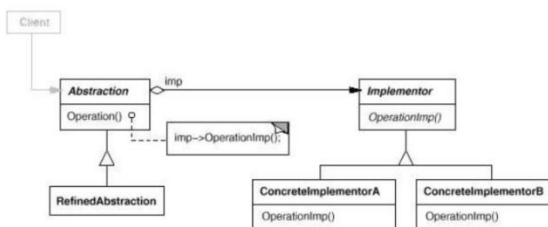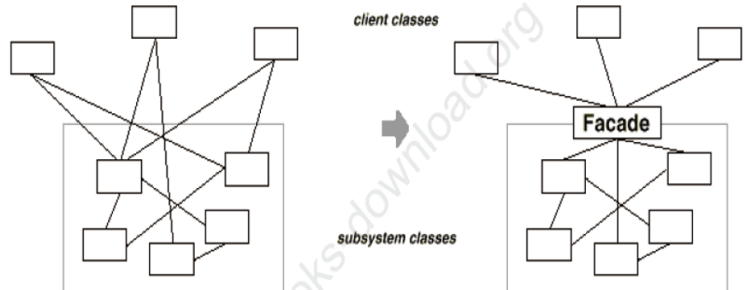
Simple example of FAÇADE (for someone who has trouble understanding without diagram)

Customer service Facade

Order fullfillment | Billing | Shipping

Compiler Facade

17. Innovative Teaching Methods

Innovative questions

1. Can you describe a real-world scenario where the Chain of Responsibility pattern could be applied in a creative way?
2. How might you combine the Decorator and Strategy patterns to enhance the functionality of a system while keeping it flexible and maintainable?
3. In what situations would you prefer using the Prototype pattern over the Factory Method pattern, and vice versa?
4. Can you provide an example of how the Observer pattern could be utilized in a distributed system or in a micro services architecture?
5. Describe a scenario where you would use the Flyweight pattern to optimize memory usage in a software application.

18. References (Textbooks/Websites)

- DesignPatternsbyErichGamma,PearsonEducation

- Pattern'sinJavaVol-IbyMarkGrand,WileyDreamTech.

- Pattern'sinJavaVol-IIbyMarkGrand,WileyDreamTech.

- JavaEnterpriseDesignPatternsVol-IIIbyMarkGrand,WileyDreamTech.

- HeadFirstDesignPatternsbyEricFreeman–Oreilly-spd.

- DesignPatternsExplainedbyAlanShalloway,PearsonEducation.

Websites:

- https://sourcemaking.com/design_patterns

- https://www.youtube.com/watch?v=9GKAc2WP3nc&list=PLmAmHQ_5ySzyZRFtQKelXzOUJ44jOYSn