


CMR Institute of Technology, Bangalore			
Department(s): Computer Science & Engineering			
Semester: 04	Section(s): MTECH(CNE)-IV SEMESTER	Lectures/week: 04	
Subject: CLIENT SERVER PROGRAMMING		Code: 16CNE41	
Course Instructor(s): SREEDEVI N			
Course duration: 02 Jan 2018 – 28 APRIL 2018			
Course Site: https://sites.google.com/a/cmrit.ac.in/sreedevi			

Course Objectives

- Explain Client-Server software, Context Switching and Protocol Software, I/O.
- Define System Calls, Basic I/O Functions available in UNIX
- Illustrate socket interface, TCP, UDP in detail.
- Compare various client Software and various algorithms issue related to server software design.

Prerequisites

- Knowledge of Advanced UNIX system programming.
- Concept of Computer networks
- Functions of Operating System.

Lesson Plan				
Lecture #	Book & Sections	Topics	Portions coverage	
			Teaching Aids	% of Syllabus Covered
1-10	CH 2,3,4	UNIT – 1 The Client Server Model and Software Design: Introduction, Motivation ,Terminology and Concepts. Concurrent Processing in Client-Server software: Introduction, Concurrency in Networks, Concurrency in Servers, Terminology and Concepts, An example of Concurrent Process Creation, Executing New Code, ContextSwitching and Protocol Software Design, Concurrency and Asynchronous I/O. Program Interface to Protocols: Introduction, Loosely Specified Protocol Software Interface, Interface functionality, Conceptual Interface Specification, System Calls,Two Basic Approaches to Network Communication, The Basic I/O Functions available in UNIX, Using UNIX I/O with TCP/IP.	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures:				
11-20	Ch 5 ,6	UNIT-2 The Socket Interface: Introduction, Berkley Sockets, Specifying a Protocol Interface ,The Socket Abstraction, Specifying an End Point Address, A Generic Address Structure, Major System Calls used with Sockets, Utility Routines for Integer Conversion, UsingSocket Calls in a Program, Symbolic Constants for Socket Call Parameters. Algorithms and Issues in Client Software Design: Introduction, Learning Algorithms instead of Details, Client Architecture, Identifying the Location of a Server, Parsing an Address Argument, Looking up a Domain Name, Looking up a well-known Port by Name, Port Numbers and Network Byte Order, Looking up a Protocol by Name, The TCP Client Algorithm, Allocating a Socket, Choosing a Local Protocol Port Number, A fundamental Problem in choosing a Local IP Address, Connecting a TCP Socket to a Server, Communicating with the Server using TCP, Reading a response from a TCP Connection, Closing a TCP Connection, Programming a UDP Client, Connected and Unconnected UDP Socket, Using Connect with UDP, Communicating with a Server using UDP, Closing a Socket that uses UDP, Partial Close for UDP, A Warning about UDP Unreliability.	Chalk and Talk Video Lectures for some topics	40
Links to some useful online lectures:				
<ul style="list-style-type: none"> • nptel.ac.in/courses/106105084/30 				
21-30	Ch 7	UNIT 3- Example Client Software: Introduction, The Importance of Small Examples, Hiding Details, An Example Procedure Library for Client Programs, Implementation of Connect TCP, Implementation of Connect UDP, A Procedure that Forms Connections, Using the Example Library, The DAYTIME Service, Implementation of a TCP Client for DAYTIME, Reading from a TCP	Chalk and Talk	60

		Connection, The Time Service, Accessing the TIME Service, Accurate Times and Network Delays, A UDP Client for the TIME Service, The ECHO Service, A TCP Client for the ECHO Service, A UDP Client for the ECHO Service.		
Links to some useful online lectures: pirate.shu.edu/Teaching/CSAS2214/Virtual/Lectures/				
31-40	CH 8	UNIT 4 - Algorithms and Issues in Server Software Design: Introduction, The Conceptual Server Algorithm, Concurrent Vs Iterative Servers, Connection-Oriented Vs Connectionless Access, Connection-Oriented Servers, Connectionless Servers, Failure, Reliability and Statelessness, Optimizing Stateless Servers, Four Basic Types of Servers, Request Processing Time, Iterative Server Algorithms, An Iterative Connection-Oriented Server Algorithm, Binding to a Well Known Address using INADDRANY, Placing the Socket in Passive Mode, Accepting Connections and using them. An Iterative Connectionless Server Algorithm, Forming a Reply Address in a Connectionless Server, Concurrent Server Algorithms, Master and Slave Processes, A Concurrent Connectionless Server Algorithm, A concurrent Connection-Oriented Server Algorithm, Using separate Programs as Slaves, Apparent Concurrency using a Single Process, When to use each Server Types, The Important Problem of Server Deadlock, Alternative Implementations.	Chalk and Talk Video Lectures for some topics	80
Links to some useful online lectures: <ul style="list-style-type: none"> www.cs.odu.edu/.../courses/cpsc826-f04/lectures/2-ClientServer/ 				
41-50	CH 9,10	UNIT 5 - Iterative, Connectionless Servers (UDP): Introduction, Creating a Passive Socket, Process Structure, An example TIME Server. Iterative, Connection-Oriented Servers (TCP): Introduction, Allocating a Passive TCP Socket, A Server for the DAYTIME Service, Process Structure, An Example DAYTIME Server, Closing Connections, Connection Termination and Server Vulnerability. Concurrent, Connection-Oriented Servers (TCP): Introduction, Concurrent ECHO, Iterative Vs Concurrent Implementations, Process Structure, An example Concurrent ECHO Server, Cleaning up Errant Processes.	Chalk and Talk	100
Links to some useful online lectures: <ul style="list-style-type: none"> https://www.btechguru.com/training--certification-courses--ccna/ 				

Text Books	
1.	1. Douglas E. Comer, David L. Stevens: Internetworking with TCP/IP – Vol. 3, Client-Server Programming and Applications, BSD Socket Version with ANSI C, 2nd Edition, Pearson, 2001
Reference Books	
1.	NIL

Syllabus for Internal Assessment Tests (IAT*)

IAT #	Syllabus
IAT-1	Class # 01 – 18
IAT-2	Class # 19–37
IAT-3	Class # 38–50

*See calendar of events for IAT schedule.

Course Outcomes

By the end of this course, students will be able to
Compare and contrast Client Software, Various applications and their issues
Demonstrate programming System Calls,
Demonstrate basic I/O Functions available in UNIX
Explain Client-Server software,
Explain Context Switching and Protocol Software, I/O interface.
Implement Socket interface, TCP, UDP in detail.

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO1	Compare and contrast Client Software, Various applications and their issues	1	2	2	1	1	-	2	-	-	1	1	-	1
CO2	Demonstrate programming System Calls,	2	2	3	2	2	1	1	-	1	1	1	1	2
CO3	Demonstrate basic I/O Functions available in UNIX	2,3	2	3	2	1	2	1	1	1	1	1	1	1
CO4	Explain Client-Server software,	4	2	3	3	1	2	1	1	1	1	1	-	1
CO5	Explain Context Switching and Protocol Software, I/O interface.	4,5	2	3	3	1	2	-	1	-	1	1	1	2
CO6	Implement Socket interface, TCP, UDP in detail.	5	2	3	3	1	1	-	1	-	1	1	1	1

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Appendix

Table 01: Cognitive Levels


Cognitive Levels	
Cognitive level	Revised Blooms Taxonomy Keywords
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

Program Outcomes (PO), Program Specific Outcomes (PSO)	
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	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.
PO3	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.
PO4	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.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	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.
PO7	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.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	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.
PO11	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.
PO12	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.

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

CMR Institute of Technology, Bangalore		
Department(s): Computer Science & Engineering		
Semester: 04	Section(s): MTECH CNE	
Service Oriented Architecture	16SCN421	Lectures/week: 04
Course Instructor(s): Ms. Savitha.S		
Course duration: 02 Jan 2018 – 25 May 2018		

Course Objectives
<ul style="list-style-type: none"> ➤ Interpret various architecture for application development ➤ Demonstrate the importance of SOA in Application Integration ➤ To learn web service and SOA related tools ➤ To Learn implementation details of SOA ➤ To understand varies case studies
Prerequisites
<ul style="list-style-type: none"> ➤ Principles of Software Engineering. ➤ Knowledge on .NET framework Libraries. ➤ Basic Understanding on Enterprise Application platforms. ➤ Basic Understanding on Web Services. ➤ Basic understanding of Cloud applications.

LESSON PLAN				
Lecture #	Book & Sections	Topics	Portions coverage	
			Teaching Aids	% of Syllabus Covered
1-12	TB1: - 2.3,3.2,3.5, 3.6,4.2,5.2, 6,7.2,7.5	Module-1 SOA BASICS :Software Architecture – Types of IT Architecture – SOA – Evolution – Key components – perspective of SOA – Enterprise-wide SOA – Architecture – Enterprise Applications – Solution Architecture for enterprise application – Software platforms for enterprise Applications – Patterns for SOA – SOA programming models.	Chalk and Talk Video Lectures for some topics	20

<p>Links to some usef online lectures:</p> <ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=L1tM0tMJdzY ➤ https://www.youtube.com/watch?v=A3_QIYJRVvk ➤ https://www.youtube.com/watch?v=l_G9tcof52M ➤ https://www.youtube.com/watch?v=d1MPEmMBqc0 				
13-22	TB1 8.3-8.6 9.1,9.2,10.1 -10.3,	<p>Module 2 SOA ANALYSIS AND DESIGN: Service-oriented Analysis and Design – Design of Activity, Data, Client and business process services – Technologies of SOA – SOAP –WSDL – JAX – WS – XML WS for .NET – Service integration with ESB – Scenario –Business case for SOA – stakeholder OBJECTIVES – benefits of SPA – Cost Savings.</p>	<p>Chalk and Talk</p> <p>Video Lectures for some topics</p>	40
<p>Links to some useful online lectures:</p> <ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=-FBs7xFOzA4 ➤ https://www.youtube.com/watch?v=xrFchYKBTrg ➤ https://www.youtube.com/watch?v=xrFchYKBTrg 				
23-32	TB1 11.1,12.3,A nnexure A,B,C	<p>Module 3 SOA GOVERNANCE:SOA implementation and Governance – strategy – SOA development – SOA governance – trends in SOA – event-driven architecture – software as a service – SOA technologies – proof-of-concept – process orchestration – SOA best practices.</p>	<p>Chalk and Talk & Video Lectures for some topics</p>	60
<p>Links to some useful online lectures:</p> <ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=-gtnAZVjS2c ➤ https://www.youtube.com/watch?v=0J4iHaUOpzU ➤ (Service-Oriented Architecture: Concepts, Technology, and Design ... 				
33-42	TB2	<p>Module 4 SOA IMPLEMENTATION:SOA based integration – integrating existing application – development of web services – Integration - SOA using REST – RESTful services – RESTful services with and without JWS – Role of WSDL,SOAP and Java/XMLmapping in SOA – JAXB Data binding.</p>	<p>Chalk and Talk</p> <p>Video Lectures for some topics</p>	80
<p>Links to some useful online lectures:</p>				

➤ https://www.youtube.com/watch?v=bPNfu0IZhoE
➤ https://www.youtube.com/watch?v=wtcJzVJtX3U&t=2593s

43-52	TB2	Module 5 APPLICATION INTEGRATION: JAX-WS 2.0 client side/server side development –Packaging and Deployment of SOA component – SOA shopper case study –WSDL centric java WS with SOA-J – related software – integration through service composition (BPEL) – case study - current trends.	Chalk and Talk Video Lectures for some topics	100
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Links to some useful online lectures:

- [1 HRS2422 Web Services JAX-WS and SOAP Introduction Web...](#)

Text Books	
1.	Shankar Kambhampaly, “Service–Oriented Architecture for Enterprise Applications”, Wiley 2008.
Reference Books	
2.	Mark D. Hansen, “SOA using Java Web Services”, Practice Hall, 2007.
3.	Waseem Roshen, “SOA-Based Enterprise Integration”, Tata McGraw-HILL, 2009.
4.	Larry L. Peterson and Bruce S. Davie: Computer Networks – A Systems Approach, 4th Edition, Elsevier, 2007.

Syllabus for Internal Assessment Tests (IAT) *

IAT #	Syllabus
IAT-1	Class # 01 – 24
IAT-2	Class # 25–40
IAT-3	Class # 41–52

* : See calendar of events for the schedules of IATs.

Course Outcomes
By the end of this course, students will be able to
1. Compare different IT architecture
2. Analyze and design of SOA based applications
3. Implement web service and realize of SOA
4. Implement REST full services
5. Design and implement of SOA based Application Integration using BPEL

COGNITIVE LEVELS	
Cognitive level	REVISED BLOOMS TAXONOMY KEYWORDS
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

PROGRAM OUTCOMES (PO), PROGRAM SPECIFIC OUTCOMES (PSO)	
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	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.
PO3	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.
PO4	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.
PO5	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.
PO6	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.
PO7	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.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	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.
PO11	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.
PO12	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.

CORRELATION LEVELS

0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

Course Outcomes		Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Interpret various architecture for application development and Understand the software platforms for enterprise applications and SOA programming models.		-	1	1	-	-	-	1	-	-	2	2	1
CO2	To analyze , design Business services and Demonstrate the importance of SOA in Application Integration		1	2	2	-	1	-	-	-	-	-	2	2
CO3	To learn web service and SOA related tools and SOA technologies		-	1	2	-	2	-	-	-	-	-	1	-
CO4	To understand the implementations and application integration of SOA		-	1	2	-	2	-	-	-	-	-	1	-
CO5	To understand varies case studies		-	2	1	-	-	-	-	-	2	-	2	2

Note : From time to time, assignments will be posted on

<https://sites.google.com/a/cmrit.ac.in/savitha-s>