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Roll No. .....

TCS–661

B. TECH. (CSE) (SIXTH SEMESTER)

END SEMESTER EXAMINATION, 2022

PROJECT MANAGEMENT

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Elaborate major activities software project management life cycle. (CO1, CO3)

(b) Describe the meaning of Project. What are the different objectives for Software Project Management ? (CO1, CO3)

(c) Differentiate between the following by giving a suitable example : (CO1, CO3)

(i) PERT and CPM

(ii) Evolutionary ad Throwaway Prototype

P. T. O.

2. (a) Discuss the authorities of a project manager in detail. (CO1, CO2)

(b) Compare the Walston-Felix Model with the SEL model on a software development expected to involve 7 person-years of effort. (CO1, CO2)

(i) Calculate the number of lines of source code that can be produced.

(ii) Calculate the duration of the development.

(iii) Calculate the productivity in LOC/PY.

(iv) Calculate the average manning.

(c) Discuss the importance of Work Breakdown Structure (WBS) for any project. Explain different types of WBS with example. (CO1, CO2)

3. (a) (i) Explain Cost-Benefit Analysis in detail. (CO5, CO6)

(ii) Given some of the risks. Categorise them as either 'managerial' or as 'technical' risks with reasons : (CO5, CO6)

(A) Behavior of purchased software is incompatible with published standard.

(B) The component delivery date is later than planned.

(b) Differentiate between the following with proper example : (CO5, CO6)

(i) Informal and formal review

(ii) Cost Variance and Schedule Variance

(c) Discuss idea behind Pair Programming in detail. Also explain its advantages and disadvantages. (CO5, CO6)

4. (a) You are managing a project which is into fifth months of its execution. You are now reviewing the project status and you have ascertained that project is behind schedule. The actual cost of Activity A is ₹ 3,00,000 and that of Activity B is ₹ 2,00,000. The planned value of these activities are ₹ 2,80,000 and ₹ 80,000 respectively. The activity A is 100% complete. However, Activity B is only 60% complete. Calculate the Schedule Performance Index (SPI) and Cost Performance Index (CPI) of the project on the review date. (CO1, CO3)

(b) There are four important dimensions of the project—people, process, project and technology. Discuss the implications of each of these four project dimensions for success of software project. (CO1, CO3)

(c) (i) Why is it important to identify critical path in project network ? Write down all the steps to identify the critical path.

(ii) Draw Activity on Arrow Network Diagram and find out critical path : (CO1, CO3)

Activity	A	B	C	D	G	E	F	L	M
Duration (in Days)	4	5	4	5	4	3	3	1	4
Following Activity	C, D	G	E	F	L	M	M	M	–

5. (a) Describe the meaning of testing in terms of Software. Differentiate between functional and structural testing with suitable example. (CO1, CO4)

(b) Why is risk management important for any project ? Explain Risk Management Process in detail. (CO1, CO4)

(c) One supermarket owner is considering the implementation of a computer-based system to help administrator at supermarket. Identify the stakeholders in this project. What might be the objectives of a project and how might the success of the be measured in practical terms. (CO1, CO4)

Roll No. .....

TCS–632

B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2022

ARTIFICIAL INTELLIGENCE

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) How many types of problem exist are there in search algorithms ? Also discuss the problem solving agents with an example of path finding solution. (CO1)

(b) Explain advanced steepest hill algorithm. How is it different from traditional hill algorithm ? (CO3)

(c) What are the different difficulties exist in natural language understanding ? Explain each of them in detail. (CO2)

2. (a) Describe the following :

(i) Ridge

P. T. O.

(ii) Local Maximum

(iii) Plateau

where all of the above exist in artificial intelligence ? (CO2)

(b) Explain pruning in the context of AI. How is it different from Alpha and Beta pruning ? How do we modify an algorithm using pruning ? Describe with example. (CO3)

(c) Describe the bidirectional search algorithm with example. Also discuss the time and space complexity of bidirectional search algorithm. (CO2)

3. (a) Define uniform cost search algorithm. Also differentiate between depth limited and beam search algorithm. (CO3)

(b) Describe 8 tiles problem using state space search algorithm. (CO4)

(c) Mention a scenario where BFS is better than DFS. (CO5)

4. (a) Consider the following sentences and represent CFG for each sentence : (CO4)

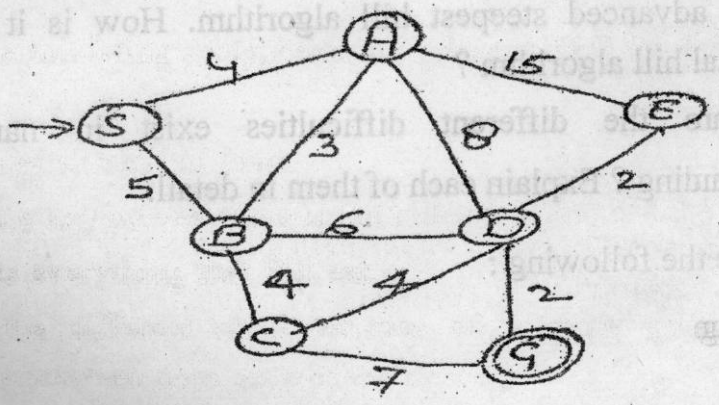
(i) John likes all kind of food.

(ii) Anything any one eats and is not killed by food.

(iii) Sue eats everything that Bill eat.

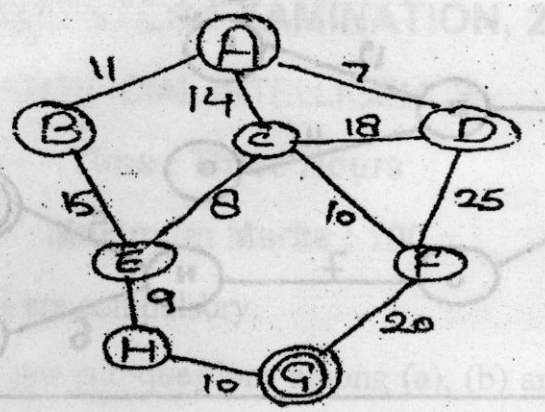
(b) What are the different characteristics of fillmore grammar ? Also differentiate between deep vs. surface structure. (CO2)

(c) Find the shortest path from the source S to destination G for the following graph using branch and bound algorithm : (CO5)



5. (a) Suppose capacities of two jugs are 2 litres and 3 litres respectively. Fill exactly 1 litre in 2 litre jug, as per the rules of "water jug" state representation. (CO5)

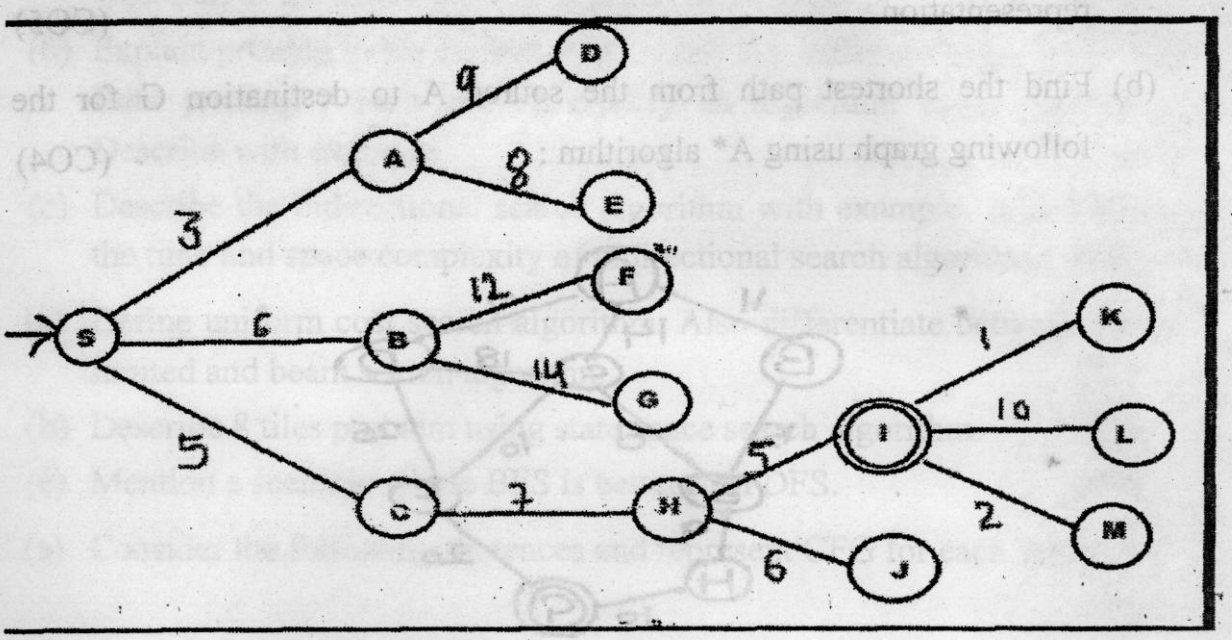
(b) Find the shortest path from the source A to destination G for the following graph using A* algorithm : (CO4)



Heuristic values are given below :

A-G	40
B-G	32
C-G	25
D-G	35
E-G	19
G-G	17
G-G	0
H-G	10

(c) Find the shortest path from the source S to destination I for the following graph using best first search : (CO4)



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Roll No. .....

TCS–693

B. TECH. (CSE) (SIXTH SEMESTER)

END SEMESTER EXAMINATION, 2022

FULL STACK WEB DEVELOPMENT

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Explain, how events are handled in JavaScript. Write an event handler program using function to hide e-mail addresses to protect from unauthorized user. (CO1, CO2, CO4)

Test Data :

(protect_email("robin_singh@example.com"));

"robin...@example.com".

P. T. O.

(b) HITML-4 and HTML-5 have some differences. Can you state a few differences along with the explanation of audio and video tags of HTML-5 with its various attributes ?

Write down a JavaScript code that controls the play and pause of audio and video on a page using a toggle button.

Write down all the assumptions that you are going to make before creating the script. When you are done with writing the script, explain the CSS box model along with its different parts. Also, explain, using an example, how you can calculate the element width and height when you are given the width and height of various parts of the CSS box model. (CO1, CO2, CO4)

(c) Can you explain some of the sorting methods of associative arrays in PHP ? Write a program to declare an associative array and sort them in ascending order with the help of keys. (CO1, CO2, CO4)

2. (a) Define XML and list the rules to be followed by XML documents. What is the XML Namespace ? How to use CSS inside an XML file ? (CO3, CO4, CO3)

(b) Define DTD (Document Type Dedefinition). What is a PCDATA and CDATA section in XML ? With the help of XML, create a database of employees and validate it with the help of DTD. (CO3, CO4, CO3)

(c) What is the difference between XML and JSON ? Which one is better for storing unstructured databases ? (CO3, CO4, CO3)

3. (a) What is the difference between JavaScript and jQuery ? What are the two ways of using jQuery on your website and which one of them is better and why ? Write the syntax of jQuery and explain how you can hide and unhide an element (using element tag, class, and ID for selecting element) when the mouse enters or leaves that element. Also, explain how and why you should use the document ready event for executing jOuery methods. (CO4)

(b) Explain the concept of AJAX/Jquery. Write a program to fetch the content of JSON file named json_demo.json with the help of AJAX and visualize the database on the client side. (CO4)

```
{
   "name" :"John",
   "birth" :"1986-09-11",
   "age" : "function( ) {return 34;}",
   "pets:[
      { "animal": "dog", "name" : "Fido"},
      { "animal" : "cat", "name" : "Felix" },
      { "animal" : "hamster", "name" :"Lightning" }
   ]
}
```

(c) Explain how validations are done on the client-side and server-side. Which one is more secure ? Justify your answer with a form validation using regular expression. (CO4)

4. (a) Can you explain the associative arrays in PHP along with the detailed description of $_GET, $_POST and $_REQUEST super global variables ? Also, use a suitable example, to explain the way you can extract the data from $– GET, $_POST and $—REQUEST from server side using PHP. (CO4, CO5)

(b) Create an HTML form that takes the username and password of an admin (uses data from Table-Login) and logs him in on clicking a login button. On successful login, admin should be redirected to another page (index page) that contains a record of all the students in a tabular format (as given below), while it should remain on the login page in case of an error. The record should be collected from the user by using another form which takes enrolmentNo, username, name, email, phoneNo, gender, and country as input (storing data to Table – userRecord). Use the radio box to select gender and drop down to elect the country of the student. You should use suitable attributes to ensure that no field is left empty. (CO4, CO5)

(c) Write down the insert, edit and delete query on (Table–userRecord) mentioned in above question and explain the way you will execute : with the help of php : (CO4, CO5)

Enrolment No	Username	Name	Email	PhoneNo	Gender	Country

5. (a) How failures in execution are handled with include( ) and require( ) functions ? What is the main difference between require( ) and require_once( ) ?

(CO4, CO5)

(b) Describe the difference between sessions and cookies. Which one is better and why ? Write a program to design a login page with user_name, password, emember_me (checkbox) and submit button, if user checks the remember_me then these credentials should be stored in the form of cookies and session variables in sessions. When user logs out of the page, all session variables and sessions should be destroyed ?

(CO4, CO5)

(c) Describe file handling in PHP, With the help of PHP code insert some text in text file. After inserting the text read the text from the same text file and shows it on webpage.

(CO4, CO5)

5. (a) How failures in execution are handled with include( ) and require( ) functions ? What is the main difference between require( ) and require_once( ) ?

(CO4, CO5)

(b) Describe the difference between sessions and cookies. Which one is better and why ? Write a program to design a login page with user_name, password, emember_me (checkbox) and submit button, if user checks the remember_me then these credentials should be stored in the form of cookies and session variables in sessions. When user logs out of the page, all session variables and sessions should be destroyed ?

(CO4, CO5)

(c) Describe file handling in PHP, With the help of PHP code insert some text in text file. After inserting the text read the text from the same text file and shows it on webpage.

(CO4, CO5)

Roll No. .....

TCS–604

B. TECH. (SIXTH SEMESTER)

END SEMESTER EXAMINATION, 2022

COMPUTER NETWORKS-I

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Discuss the Multiplexer and answer the following :

Five channels, each with a 100 kHz bandwidth, are to be multiplexed together. What is the minimum bandwidth of the link if there is a need for a guard band of 10 kHz between the channels to prevent interference ? (CO1)

(b) Identify the layers in OSI reference model and illustrate their functions. (CO1)

P. T. O.

(c) Derive EstimatedRTT, DevRTT and Timeout Interval. Suppose that five measured SampleRTT values are 106 ms, 120 ms, 140 ms, 90 ms, and 115 ms. Compute the EstimatedRTT after each of these SampleRTT values is obtained, using a value of alpha = 0.125 and assuming that the value of EstimatedRTT was 100ms just before the first of these 5 sample were obtained. (CO1)

2. (a) Consider an HTTP client that wants to retrieve a web document at a given URL. The IP address of the HTTP server is initially unknown. What transport and application layer protocols besides HTTP are needed in this scenario ? (CO2)

(b) (i) When routers generate ICMP messages, to where do they send them ? Along with the ICMP header at the beginning, what additional contextual information do routers include in the messages ?

(ii) Are ICMP messages delivered reliably ? If so, briefly explain the mechanism. If not, give a reason why not ?

(iii) Name any *two* circumstances under which an end-host (and not a router) will send an ICMP message. (CO2)

(c) Discuss about DASH. (CO2)

3. (a) Define UDP. Discuss the operation of UDP. Explain UDP checksum with an example (CO3)

(b) Consider a new peer Alice that joins Bit Torrent with possessing any Chunks. Without any chunks, she cannot become a top-four uploader for any other peers, since she has nothing to upload. How then will Alice get her first chunk ? (CO3)

(c) In GB4 (Goback-N), if every 6th packet being transmitted is lost and if we have to spend 10 packets, then how many transmissions are required ? (CO3)

4. (a) Represent a 3500-byte datagram that has arrived at router R1 and needs be sent to R2 over a connection with an MTU of 500 bytes. Assume that the size of the IP header is 20 bytes. What is the total number of fragments sent to the destination ? The parameters associated with each of these fragments should be shown. (CO4)

(b) Generalize each field of the format of the TCP packet header. Specify the justification for having variable field lengths for the fields in the TCP header. (CO4)

(c) Explain Reliable Protocol and answer the following :

Imagine a TCP connection is transferring a file of 6000 bytes. The first byte is numbered 10010. What are the sequence numbers for each segment if data are sent in five segments with the first four segments carrying 1000 bytes and the, last segment carrying 2000 bytes ? (CO4)

5. (a) An organization is granted the block 125.238.0.0/16. The administrator wants to create 512 subnets : (CO5)

(i) Find the subnet mask required.

(ii) Find the number of addresses in each subnet.

(iii) Find the first and last allocatable addresses in the 1st subnet.

(iv) Find the first and last allocatable addresses in the 14th subnet.

(b) Consider hosts A and B have been assigned the same IP address on the same Ethernet, on which ARP is used B starts up after A. What will happens to A's existing connections ? Explain how self-ARP might help with is problem. (CO5)

(c) Why is subnetting necessary ? With suitable example, develop the concept of subneting in class B network. (CO5)

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TCS–601

B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2022

COMPILER DESIGN

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Discuss the various phases of a compiler. Show the translation for the statement X = Y + Z * 8.0 by indicating the output of each phase. (CO1)

(b) Why is two-buffer scheme used in lexical analysis ? Develop an algorithm for "look ahead code with sentinels". (CO1)

(c) Construct the transition diagram to recognize the tokens given below : (CO1)

(i) Identifier

(ii) Relational operator

(iii) Unsigned number

P. T. O.

2. (a) Find First and Follow sets for the given grammar : (CO2)

$S \rightarrow A$

$A \rightarrow aB|Ad$

$B \rightarrow b$

$C \rightarrow g$

(b) Design SLR parser for the following grammar by computing LR (0) items set : (CO2)

$S \rightarrow AA$

$A \rightarrow aA|b$

(c) Construct LR(1) item sets and data flow diagram for the given grammar : (CO2)

$E \rightarrow BB$

$B \rightarrow cB|d$

3. (a) Construct LL (1) parsing table for the following grammar. Also show moves made by input string : abba (CO3)

$S \rightarrow aBa$

$B \rightarrow bB|\varepsilon$

(b) Discuss the concept of syntax directed translation/definition with example. (CO3)

(c) Explain the dependency graph and construct the dependency graph for the arithmetic expression 10 + 8*5. (CO3)

4. (a) Construct the DAG for the expression ((a*b) + (c – d)*(a*b)) + b and list the SDT to produce a directed acyclic graph for an expression. (CO3)

(b) Translate the arithmetic expression m + m*(n-q) + (n – q)*p into three address code and represent the generated three address code in Quadruple, Triple and Indirect Triple. (CO4)

(c) Consider an array of X of size 10 and Y of size 10. Assume low = 1 and width of the element is 4 units. Generate the three address code for the following code segment : (CO4)

```
sum=0
for i from 1 to 10
sum=sum+X[i]*Y[i]
```

5. (a) Assume you are working in a compiler design company and while designing code generator you may analyse various issues. Discuss those issues with example. (CO5)

(b) Develop a three address code and construct basic blocks for the following code segment : (CO5)

```
sum=0
for(i=1; i<=10; i++)
{
    if(i <=5)
    }
        sum=sum+i
    }
    else {
      sum=sum–i
    }
}
```

(c) Discuss a simple code generation with example. (CO5)

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Roll No. .....

TCS–651

B. TECH. (CSE, CC) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2022

DEVOPS ON CLOUD

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) How is DevOps different from Agile/SDLC ? (CO1, CO2)

   (b) Mention some of the core benefits of DevOps with suitable examples. (CO1, CO2)

   (c) Explain the difference between a centralized and distributed version control system (VCS). (CO1, CO2)

2. (a) Mention some useful plugins you have used in Jenkins and explain their usage. (CO1, CO2, CO3)

   (b) What is dark launching ? Explain with suitable examples. (CO1, CO2, CO3)

   (c) How can we configure notifications in Jenkins ? Write down its steps. (CO1, CO2, CO3)

P. T. O.

3. (a) Explain the advantages of scheduling in Jenkins and write down the steps for configuring Poll SCM in Jenkins. (CO1, CO3)

(b) Differentiate between manual testing and automation testing. (CO1, CO3)

(c) Write down the advantages and disadvantages of using selenium, as well as write a code (in any programming language) which can open the link 'https://www.google.com/' and type 'DevOps' in the search field. (CO1, CO3)

4. (a) What are microservices ? Differentiate between virtualization and containerization. (CO1, CO4, CO6)

(b) Differentiate between type 1 and type 2 hypervisor and write down the prerequisite of installing docker in windows system. (CO1, CO4, CO6)

(c) Write any *five* most used Docker commands and explain how you can use it. (CO1, CO4, CO6)

5. (a) Explain containerization using Kubernetes. (CO3, CO5, CO6)

(b) What is CI/CD pipeline (Continuous Integration Delivery) and why is it used ? (CO3, CO5, CO6)

(c) What is docker image ? Write down the procedure for creating docker image. (CO3, CO5, CO6)

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Roll No. .....

TCS–622

B. TECH. (CSE) (SIXTH SEMESTER)

END SEMESTER EXAMINATION, 2022

CLOUD COMPUTING TECHNOLOGIES

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Discuss the cloud deployment model with appropriate use cases. (CO1)

(b) What do you understand by cloud computing reference architecture ? (CO2)

(c) Define Hypervisor. Explain the different types of hypervisors along with the examples. (CO2)

P. T. O.

2. (a) Elaborate the taxonomy of virtual tech. What is the difference between process and system virtual machine ? (CO1)

   (b) Discuss the hardware architectural styles for parallel computing. (CO2)

   (c) What are the different applications of Big data ? (CO2)

3. (a) "Cloud computing is essentially an implementation of distributed computing." Critically analyze the statement with advantages and disadvantages. (CO1)

   (b) Discuss the characteristics of Big data. What are the advantages and disadvantages of Big data ? (CO2)

   (c) What do you understand by service-oriented architecture ? What is the difference between service-oriented architecture and service-oriented computing ? (CO2)

4. (a) Write short notes on any *two* of the following : (CO1)

   (i) Big Data in scientific application

   (ii) Big Data in business application

   (iii) Big Data in real world use cases

   (b) Write short notes on any *two* of the following : (CO2)

   (i) laaS services by GCP

   (ii) laaS services by AWS

   (iii) SaaS Services by GCP

   (iv) SaaS Services by AWS

(c) Discuss the difference among Web 1.0 , Web 2.0 and Web 3.0. (CO2)

5. (a) Discuss the evolution of cloud computing by tracing it in chronological manner. (CO1)

(b) "Virtualization is considered as a major enabler for cloud computing." Critically assess the statement. (CO2)

(c) Discuss any *five* tools used for Big data analytics. (CO2)

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TCS–619

B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2022

NETWORK AND SYSTEM SECURITY

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) What are the major focusses of the OSI Security Architecture ? Explain them briefly. (CO1 & CO2)

(b) What do you mean by the term Security Attacks ? Differentiate the active and passive attacks. (CO1 & CO2)

(c) Encrypt the plaintext "network and system security" using playfair cipher. The key for encryption is "crypto". (CO1 & CO2)

P. T. O.

2. (a) Explain the CIA Triad and name two A's added to the triad recently. Briefly explain which component of this Triad is satisfied by the concept of "the two-factor authentication." (CO2 & CO3)

   (b) Encrypt as well as decrypt the plaintext "SECURE" using Affine cipher. The key for encryption is (3, 5). (CO2 & CO3)

   (c) Encrypt the plaintext "TRY's using Hill Cipher. The key for the same is "HILLMAGIC". (CO2 & CO3)

3. (a) Explain the major function of Pretty Good Privacy (PGP). (CO3 & CO4)

   (b) Why are digital signatures required and how are they implemented ? (CO3 & CO4)

   (c) Bob Chooses 7 and 11 as p and q for a communication system that uses RSA for security and the public key is (13, 77). Then find the corresponding private key and explain the process that Bob will use to send the message to Eve. (CO3 & CO4)

4. (a) Explain IEEE 802 protocol architecture and draw general IEEE 802 MPDU format. (CO3 & CO5)

   (b) Describe the various methods of distributing session keys. What is the role of Key Distribution Centre ? Explain with neat diagram. (CO3 & CO5)

   (c) With the help of a neat diagram, explain the concept of encryption, decryption and key generation of DES algorithm. (CO3 & CO5)

5. (a) Write an explanatory note on firewall, firewall characteristics, types of firewalls. (CO4 & CO5)

(b) Write an explanatory note on intruders and intrusion detection. (CO4 & CO5)

(c) Explain the requirement of Encapsulating Security Payload (ESP) w.r.t. IP security. Support your answer by showing the location of ESP Headek and Trailer in a packet. (CO4 & CO5)

Header

Roll No. .....

TCS–602

B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2022

SOFTWARE ENGINEERING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Compare the Waterfall and Prototyping model. List the type of applications where the model would be acceptable. (CO1/CO2)

   (b) Enlist and elaborate the characteristics of software. (CO1/CO2)

   (c) Define agility. List principles of agility and how they are achieved in extreme programming (XP) method. (CO1/CO2)

2. (a) List any *two* techniques used for elicitation requirements. Compare the *two* techniques and list where each is applicable. (CO4/CO5)

   (b) What is decision tree and decision table ? Give their relevance. (CO4/CO5)

P. T. O.

(c) A coffee vending machine serves coffee to customers. A customer can choose a type of coffee among a list of options, supply the amount required and get served. Each coffee is prepared by adding units of hot water, coffee powder, milk and sugar. The recipe for each coffee is stored. (CO4/CO5)

(i) Identify the functional and non-functional requirements.

(ii) Design a Data Flow Diagram (DFD) in levels.

3. (a) Discuss cohesion and coupling along with their types. (CO2)

(b) Explain and compare the following architecture styles : (CO2)

(i) Layered architecture

(ii) Repository architecture

(c) For learning management system, design the following : (CO2)

(i) Use case diagram

(ii) Activity diagram

4. (a) What is cyclomatic complexity ? How to compute cyclomatic complexity for a given code ? (CO2/CO3)

(b) Differentiate between the following : (CO2/CO3)

(i) Black box and white box testing

(ii) Alpha and beta testing

(c) Explain equivalence class partitioning and boundary value analysis methods for designing test cases. (CO2/CO3)

5. (a) What is the role of a software project management in software development ? List down the activities of SPM. (CO2/CO6)

(b) Write short notes on the following : (CO2/CO6)

(i) Software configuration management

(ii) Key processing areas in SEI CMM model

(c) What is the purpose of COCOMO model ? Discuss basic, intermediate and complete COCOMO in detail. (CO2/CO6)

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Dr. Manoj Diwakar
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Roll No. .....

TCS–691

B. TECH. (CSE/IT) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2022

IMAGE PROCESSING AND COMPUTER VISION

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) How one can differentiate between image processing and image analysis and computer vision ? Also comment on "Captured image is never best resolution and best quality image". (CO1, CO2)

(b) Explain how the spatial and gray level resolution of images is affected by sampling and quantization. Also distinguish between digital image and binary image. Give suitable example to each type of images. Write Pseudo code for color image to binary image conversion. (CO1, CO2)

P. T. O.

(c) Explain how the Log Transformation and Power-Law Transformation are used to enhance the images. Explain with suitable examples.

(CO1, CO2)

2. (a) Explain high pass filtering in spatial domain using 8-bit 3 × 3 image. Also comment on "A high pass-filtered image can be obtained by using the method of subtracting a low pass filtered image, from the original".

(CO2, CO3)

(b) How first order and second order derivative are utilized to enhance the image quality ? Explain first order and second order derivative for the following data : (CO2, CO3)

15	41	13	13	42	0	0	31	31	15

(c) How image averaging is used to enhance the image ? Design an algorithm/Pseudo code for obtaining the average of four images of same size in transform domain. (CO2, CO3)

3. (a) Consider that CT scanned images are noisy and blurred, and the doctors are not able to diagnose due to noise and blurring problem in CT scanned images. Discuss a suitable method to remove/reduce noise and blurring problem and also discuss the process of CT image reconstruction and reasons of noise and blurring in medical images.

(CO3, CO4)

(b) Design an algorithm/Pseudo code to restore the noisy image using Mean filter in transform domain. Also explain with suitable example by considering 5 × 5 image matrix. (CO3, CO4)

(c) Why do we need Image Compression ? Explain with a suitable example and show how does image compression work using any compression method. (CO3, CO4)

4. (a) Why CNN is used for image classification ? Does CNN work for image classification ? Explain with a suitable example. (CO4, CO5)

(b) Explain linear and non-linear operation. Also Show Max operation is non-linear operation. (CO4, CO5)

(c) How does sharpening filter work in image processing ? Which method is effectively works for image sharpening in frequency domain ? Explain and justify your answer. (CO4, CO5)

5. (a) Why is human activity recognition important ? How feature extraction helpful to identify the human activity ? Explain by considering a real time example. (CO5, CO6)

(b) How background subtraction technique is utilized to identify the objects in Videos ? If the videos are noisy, what will be the impact on the results of background subtraction technique in Videos ? (CO5, CO6)

(c) Write an algorithm for canny edge detection. Discuss why canny edge detection is most popular approach for detecting discontinuities. Justify your answer with the help of a suitable example. (CO5, CO6)

350

10/06/2022

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Roll No. .....

TIT–608

B. TECH. (IT) (SIXTH SEMESTER)

END SEMESTER EXAMINATION, 2022

INFORMATION THEORY AND CODING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) What is the need for cyclic codes ? Apply right and left circular shift on string–1000111001. Draw diagram using pencil to showcase the shifting. (CO1, CO4)

(b) Give a brief idea of Arithmetic Encoding. How is it better than Adaptive Huffman Encoding ? (CO1, CO4)

(c) Explain Information Theory Methodology and properties of information. (CO1, CO4)

P. T. O.

2. (a) TIFF stands for ..... ? Write its advantage as well as disadvantage over JPEG. Explain its applications. (CO1, CO2)

   (b) Define Shannon-Hartley Theorem and explain its applications in real world. (CO1, CO2)

   (c) "Adaptive Huffman Coding is a significant improvement in text compression." Support this statement in your own words. (CO1, CO2)

3. (a) Write short comings of Delta Modulation. How is it different from adaptive delta modulation technique ? (CO4, CO3)

   (b) Why do we need linear block codes ? Write the advantages and disadvantages of using the same. (CO4, CO3)

   (c) Explain MPEG Layer 01, Layer 02 and Layer 03 Coder. (CO4, CO3)

4. (a) Difference between Lossy Compression and Lossless Compression. (CO3, CO4)

   (b) Discuss about *three* types of compression models. (CO3, CO4)

   (c) A dataword generated by some encoding technique at sender is "100100001" with a divisor of "1101". This divisor is shared between sender and receiver while transferring the given data word. During communication due to external noise, the data word "100000001" is received at receivers ends. Now, the validation of receiving data is required before further processing. Apply some coding mechanism to find his error in the received data. (CO3, CO4)

5. (a) Explain image and text compression using a suitable real time example with few of the generally used format of each type. (CO2, CO5)

   (b) How is video compression different from audio or image compression, although all of these are multimedia formats ? (CO2, CO5)

   (c) State the different types of audio compressors. (CO2, CO5)

100

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Roll No. .....

TIT–607

B. TECH. (IT) (SIXTH SEMESTER)

END SEMESTER EXAMINATION, 2022

SOFTWARE VERIFICATION, VALIDATION AND TESTING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Justify your answer : (CO1, CO2, CO3)

(i) The purpose of testing is to check the functionality of the software.

(ii) Everything must be recorded in software testing.

(b) With reference to coverage based white-box testing, prove that branch coverage ensures statement coverage, but statement coverage does not ensue branch coverage. Take appropriate examples in support of your answer. (CO1, CO2, CO3)

P. T. O.

(c) (i) What is the psychology behind testing by an independent team ?

(ii) How many states does a bug have ? Explain each stage with the flowchart.

(CO1, CO2, CO3)

2. (a) For the given program : (CO1, CO2, CO3)

(i) Draw the DD graph.

(ii) List all independent paths.

(iii) Design all test cases from independent paths.

(iv) Derive all du-paths and dc-paths using data flow testing by listing out define and use and kill nodes :

(1) read x, y;

(2) if (x > y)

(3) a = x + 1

(4) else

(5) a = y – 1

(6) print a;

(b) A program calculates the total salary of an employee on condition that if the working hours are less than or equal to 48, then give normal salary. The hours over 48 on normal working days are calculated at the rate of 1.25 of the salary. However, on holidays or Sundays, the hours are calculated at the rate of 2.00 times the salary. Derive the decision table and design test cases using decision table testing. Justify your test suites.

(CO1, CO2, CO3)

(c) A program reads three numbers A, B and C with a range [1, 50] and prints the largest number. Design test cases for this program using equivalence class testing technique. Justify your test suites.

(CO1, CO2, CO3)

3. (a) Explain the following with example : (CO1, CO2, CO3)

(i) Total branch coverage prioritization

(ii) Total fault-exposing-potential (FEP) prioritization

(b) Explain the following regression test selection techniques :

(CO1, CO2, CO3)

(i) Minimization

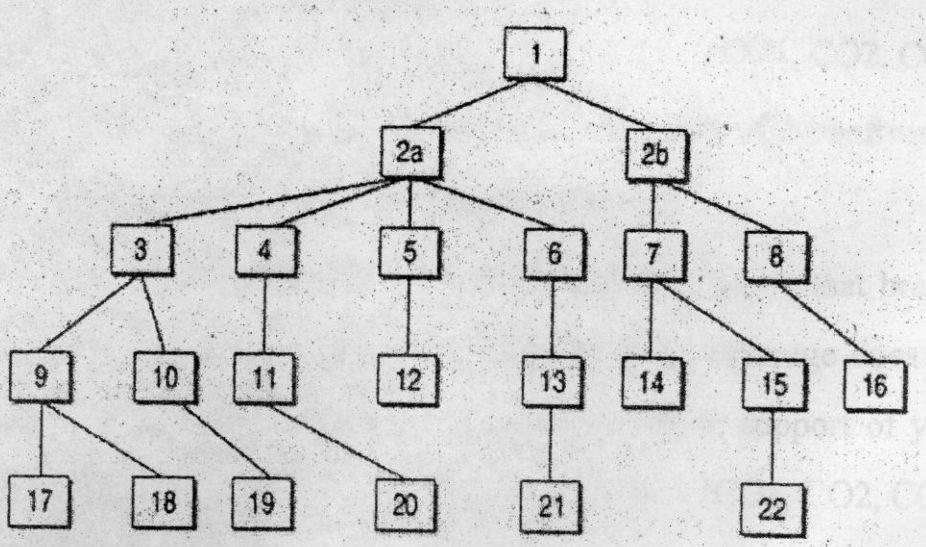
(ii) Data flow

(iii) Safe

(iv) Ad-hoc

(c) Define regression testing problem with an example. (CO1, CO2, CO3)

4. (a) Perform top-down and bottom-up integration procedure from the following system hierarchy : (CO4, CO5)



P. T. O.

(b) With suitable example, explain the significance of drivers and stubs in unit validation testing activity. (CO4, CO5)

(c) Compare top down and bottom up testing with a focus on the issues. (CO4, CO5)

5. (a) Discuss the issues in OO testing. (CO4, CO5)

(b) Identify inheritance relationship in the class identified in "calculate the salary of employees in an organization, assuming the necessary details required using the object-oriented technology". Is it possible to perform implicit control flow integration testing on the classes identified ? (CO4, CO5)

(c) What are the guidelines for selecting a testing tool ? What are the costs incurred in adopting a testing tool ? (CO4, CO5)