



NATIONAL INSTITUTE OF TECHNOLOGY, WARANGAL
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
MINOR EXAMINATION, 08th FEB 2019
III B Tech, CSE. I Semester
CS363 – WEB TECHNOLOGIES

Time: 1 hour

Max. Marks: 10

Answer ALL questions: Each question carries two marks.

1. Write HTML code to display the following.

Price of Fruit

Fruit	Price/Kg	Quantity	Total
Apple	100	2	200
Orange	80	3	160
Pineapple	40		120
Total			480

2. Describe anchor element and its attributes. Create a HTML document that uses image as a link. Use attribute *alt* to provide description of the image and link.
3. Create the following form.

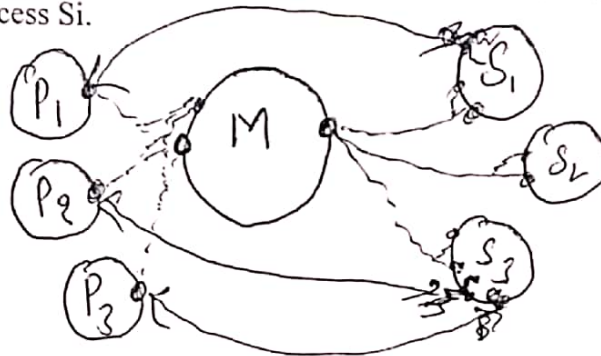
Email	<input type="text" value="eg. yourname@gmail.com"/>
Telephone	<input type="text" value="eg. 9123456789"/>
Password	<input type="password"/>
Confirm Password	<input type="password"/>
	<input type="button" value="Sign Up"/>

4. Create a web page using embedded style sheet
- To display the links in blue without underlining them.
 - Change the links background color to purple when moving mouse over it.
5. Write brief note on the following with their syntax.
- Span
 - Transition



1. Assume that there are three different types of processes as shown in diagram below. 4.5
All of the processes are in different computer systems. A process P_i wishes get served by a process S_i . But none of process P_i knows the IP address of a S_i . That's why a process P_i gets connected to M , a mediator, and sends only a single message consisting of the service server number 1, 2, 3 that it wishes to get served by. Process M never sends any message to any P_i but it facilitates a situation that there will be a direct communication between a P_i and S_i . The process M knows the IP addresses of all S_i . And further S_i serves each P_i using a separate service function thread. A process P_i must use only one file descriptor(sfd). Process M must use only three sfd's. You are required to minimize the number of sfd's in a process S_i as far as possible. You are not allowed to use a `bind()`, just before a `connect()` system call. No `dup()`s as well.

First write clear steps. Then write pseudo-code for Mediator(M), a process P_i and a Service server process S_i .



2. Consider a Chat Server that uses only the Inter Process Communication(IPC) of Message Queue. You have to use only one message queue and you are not allowed to use `fork()`, `threads`, `poll()`, `select()` and BSD sockets. All the processes involved in chat are in the same computer system. 3.5

You can have your own assumptions for message formats.

First write clear steps, then write the pseudo-code for Chat Server process and a client process.

3. An ISP(Internet Service Provider) is granted a block of addresses starting with 150.30.0.0 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows: 2

- The first group has 64 customers; each needs 256 addresses.
- The second group has 128 customers; each needs 128 addresses.
- The third group has 128 customers; each needs 64 addresses.

Design the sub blocks, give starting and ending address of each group and give subnet masks.

$$2^{24} \times 256$$

$$128 \times 128$$

$$128 \times 64$$

$$\frac{45}{225 \times 2}$$

$$\frac{2}{5} \quad \frac{2}{5} \quad \frac{1}{5}$$

$$\begin{array}{r} 128 \\ 64 \\ \hline 512 \\ 768 \\ \hline 8192 \end{array}$$

$$\begin{array}{r} 128 \\ 128 \\ \hline 1024 \\ 256 \\ \hline 128 \\ 16384 \\ \hline 32768 \\ 8192 \\ \hline 40960 \end{array}$$

close

$$\begin{array}{r} 256 \\ 64 \\ \hline 1024 \\ 1536 \\ \hline 16384 \end{array}$$

$$\begin{array}{r} 32 \\ 128 \overline{) 40960} \\ \underline{384} \\ 257 \\ \underline{248} \\ 90 \end{array}$$

$$\begin{array}{r} 16 \\ 256 \overline{) 40960} \\ \underline{256} \\ 1537 \\ \underline{1536} \\ 10 \end{array}$$



NATIONAL INSTITUTE OF TECHNOLOGY, WARANGAL
(The Institution of National Importance)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
I- MINOR EXAMINATION, FEBRUARY-2019
B.Tech- III Year (CSE), II- Semester
CS371 - SOFTWARE METRICS AND SOFTWARE PROJECT
MANAGEMENT

Time: 1 Hour

Date: 21-02-2019
Max Marks: 10

- 1 An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personal identification number. The rail ticket is issued and their credit card account charged. When the user presses the start button, a menu display of potential destinations is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued. Draw WBS outline and WBS diagram for the above automated ticket-issuing system 3
- 2 Suppose we are constructing a new building; the required construction activities are shown in the table below along with the estimated duration of each activity and any immediate predecessors. 4

Activity	Duration (weeks)	Predecessor(s)
A	2	none
B	3	A
C	3	A
D	4	C
E	8	D
F	6	B, E
G	2	F

The questions are:

1. What is the total time required to complete the project if no delays occur?
 2. What are the critical bottleneck activities?
-
- 3 IT projects are usually geographically dispersed. This means that the design of an application may take place in England and then a part of the implementation in India and another part in Germany. The strides in communication technology have enabled this to happen, and better results are achieved and passed on to the end customer. Miscommunication is a key problem in globally dispersed projects and can lead to significant problems: Use **Fishbone Diagram** to resolve a miscommunication issue. 3



NATIONAL INSTITUTE OF TECHNOLOGY, WARANGAL
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

III B. Tech (CSE), II Semester - Minor 1 Examination

Design and Analysis of Algorithms (CS361)

Date: 19-02-2019

Duration: 1 Hour

Max. Marks: 10

Note: Answer all questions.

1. Let $f(n)$ and $g(n)$ be asymptotically positive functions. Prove or disprove the conjecture:
 $\log f(n) = \Theta(\log g(n))$ implies $f(n) = \Theta(g(n))$. (0.5 M)

2. Give a recurrence for the running time of **Display()** algorithm given below, when n is input size and obtain an asymptotically tight solution to your recurrence when n is an exact power of 3. (1.5 M)

Algorithm **Display(n)**

- if $n = 1$
- return 0
- else
- for $i \leftarrow 1$ to n
- print "Diamond Jubilee Celebrations of NIT Warangal."
- Display($\frac{n}{3}$)
- Display($\frac{n}{3}$)
- Display($\frac{n}{3}$)

1 1 0 1
3 2 1 3 2

3. Design an $O(n)$ time algorithm that, given a list of n elements, finds all the elements that appear more than $\frac{n}{2}$ times in the list. Show the running time analysis of your algorithm. $n \log n$ (2 M)

4. Let S be a (not necessarily sorted) sequence of n keys. A key k in S is said to be an *approximate median* of S if $\{k' \in S : k' < k\} \geq \frac{n}{4}$ and $\{k' \in S : k' > k\} \geq \frac{n}{4}$. Design a linear time algorithm to find all the approximate medians of S . Show the running time analysis of your algorithm. (2 M)

5. A Professor wishes to develop an integer multiplication algorithm that is asymptotically faster than Karatsuba's algorithm to multiply two n -digit integers discussed in the class. His algorithm will use divide-and-conquer method, dividing each integer into pieces of size $\frac{n}{3}$, recursively solving each subproblem. The divide and combine steps together will take $\Theta(n)$ time. Determine the maximum number of subproblems i.e., $\frac{n}{3}$ digit integer multiplications his algorithm has to create in order to beat Karatsuba's algorithm. (1 M)

6. An *inversion* of a permutation is a pair of elements that are out of order. Show that the expected number of inversions in a random permutation is $\frac{n(n-1)}{4}$. (1 M)

7. You're consulting for a small computation-intensive investment company, and they have the following type of problem that they want to solve over and over. A typical instance of the problem is the following. They're doing a simulation in which they look at n consecutive days of a given stock, at some point in the past. Let's number the days $i = 1, 2, \dots, n$ for each day i , they have a price p_i per share for the stock on that day. (We will assume for simplicity that the price was fixed during each day.) Suppose during this time period, they wanted to buy 1,000 shares on some day and sell all these shares on some (later) day. They want to know: When should they have bought and when should they have sold in order to have made as much money as possible? (If there was no way to make money then they should report 0 instead.) (12 M)



NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

III B. Tech (CSE), II Semester - Mid-Semester Examinations - February 2019
Design and Analysis of Algorithms (CS361)

Date: 27-02-2019

Time: 10.00 AM to 12:00 PM

Max. Marks: 30

Note: Answer all the questions.

1. For each of the following pairs of functions $f(n)$ and $g(n)$, determine whether $f(n) = O(g(n))$, $g(n) = O(f(n))$ or neither of the two. (0.5*6=3M)
- a) $3n\sqrt{n}$ and $2^{\sqrt{n} \log_2 n}$ b) $n^2 \log n$ and $n(\log n)^{10}$
c) n^ϵ and c^n , where $\epsilon > 0$ and $c > 1$ d) $n \log_6 n$ and $n \log_2 n$
e) $n^{\frac{7}{4}}$ and $n^{\log n^9}$ f) n^2 and $n^{2+\sin n}$
2. Suppose you are given an array A with n distinct entries. You are told that the sequence of values $A[1], A[2], \dots, A[n]$ is *unimodal*: For some index p between 1 and n , the values in the array entries increase up to position p in A starting from 1, and then decrease the remainder of the way until position n . Show how to find the entry p by reading at most $O(\log n)$ entries of A . (3M)
3. Consider two sorted arrays A and B of size n each. Write an algorithm to find the median of the array obtained after merging the arrays (i.e., array of length $2n$). The complexity should be $O(\log n)$. (3M)
4. Consider an array A containing n objects that has at most k distinct keys where $k < \sqrt{n}$. The examples of keys are $-\frac{128}{279}, \pi, 5, 10^{10}$. Design an algorithm to compute a sorted array B that contains the k distinct keys occurring in A . Analyze the running time of your algorithm. (Efficient the algorithm, higher the marks!) (3M)
5. Input are a sequence S of n distinct keys, not necessarily in sorted order, and two integers m_1 and m_2 ($1 \leq m_1, m_2 \leq n$). For any $x \in S$, we define the *rank* of x to be $|\{k \in S : k \leq x\}|$. Show how to output all the keys of S whose ranks fall in the interval $[m_1, m_2]$ in $O(n)$ time. (3M)
6. Suppose we have k sorted arrays each of length n . We would like to merge the k -sorted arrays to get a single array whose elements are sorted. Give an algorithm that runs in time $O(nk \log k)$. (3M)
7. State Master Theorem. Argue why the three cases of master theorem is correct. (2M)
8. For each of the questions below, state either **TRUE** or **FALSE**. Give a brief justification to your answer. Correct answer without proper justification carries zero marks. (1.5*4=6M)
- (a) For $n \geq 4$, let $A[1 \dots n]$ be an array of n distinct elements. Consider the modified linear search (MLS) algorithm in which only the elements from $A[4]$ to $A[n/4]$ are searched to find the key element. The expected running time of MLS under the following assumption is $O(\log n)$, "Search is successful and the key is equally likely to be present in any of the elements from $A[4 \dots n/4]$ ".
- (b) The *third largest* element of an array with n distinct elements can be found using at most $\frac{5n}{2} - 3$ comparisons.
- (c) Suppose, for example, that the PARTITION procedure of QUICK SORT algorithm always splits the array in the ratio 1:5. Running time of QUICK SORT algorithm in this case is $\theta(n \log n)$.
- (d) If $T(n) = n^{\frac{3}{4}}T(\sqrt[4]{n}) + n$, for sufficient larger n , then $T(n) = \theta(n \log \log n)$.
9. An array $A[1 \dots n]$ with n distinct elements is almost K -sorted for an integer $K \geq 0$, if every element of A is within K slots of its proper position. For example, an array with elements 50, 40, 60, 10, 20, 30 is almost 4-sorted but not almost 3-sorted. (2*2=4M)
- (a) Show that maximum possible number of inversions in an almost \sqrt{n} -sorted array is $o(n^2)$.
- (b) Show that the worst case running time of INSERTION-SORT algorithm discussed in the class is $O(nk)$, if the input array is almost K -sorted, where $K \geq 1$.

Date: 26-02-2019 Time: 10.00 AM – 12.00 PM Max. Marks: 30
 N.B.: Answer ALL questions
 All programs/functions/code segments are to be written in C/C++.

- 1a) Suppose an organization has been given IP address starting from 150.70.0.0. In that organization department1 requests 505 IP addresses, department2 requests 4005 IP addresses and department3 requests 9000 IP addresses. What could be the starting IP address for department4 if it requires 1000 IP addresses? And give the starting and ending IP addresses of each department along with their subnet masks. Assume to allocate according to sequential availability. 2.5
- b) What is the error detection method used in data link layer protocols? 2.5
 Find Hamming codes for a data message 1101011. Assume even parity of 1's as parity agreement.
- 2a) Give the frame format of Ethernet data frame. Mention the significance of each field with reference to functions of data link layer. 5
 Write CSMA/CD algorithm and explain the generation of random time?
- b) Write briefly the steps/pseudo-code of writing and installing a sample network device driver. 2
3. Nitwd Super Server: Nitwd super server is similar to inetd super server, but with some differences as follows. The configuration file of this server is given below: 6

Service Name	Protocol	Port Number	Internal/ External	Limit	Service offered by
S1	TCP	11	External	25	process
S2	TCP	22	Internal	15	thread
S3	UDP	33	Internal	---	function
S4	TCP	44	External	---	process

DP
AA
Exp
F. Sub

The implications of above table column titles are same as in inetd except those of Limit, Service offered by.

Limit: The Limit value shows the maximum number of clients connections, that the server can accept. Suppose at a moment 25 clients are being served by 25 service server processes of S1. Then Nitwd chooses not to accept further requests for the service S1. Now, if any one S1 server process completes its service and exits, then Nitwd can accept one client for S1 service on port 11.

Service offered by: A service can be offered by a new process or by creating a thread or by calling a function.

S1 service receives data from client and displays onto screen. Then it reads input from the keyboard and sends it to client. (There should be arrangement of standard I/O usage in the code of S1, because dup2(nsfd,0) and dup2(nsfd,1) system calls are present in Nitwd)

S2 service receives a string as input and sends the length of the string.

Write program/pseudo code program for Nitwd Super Server, S1 service server and S2 service function only using BSD sockets.

(No need of S3 and S4 service server programs/functions and no need of writing #include statements).

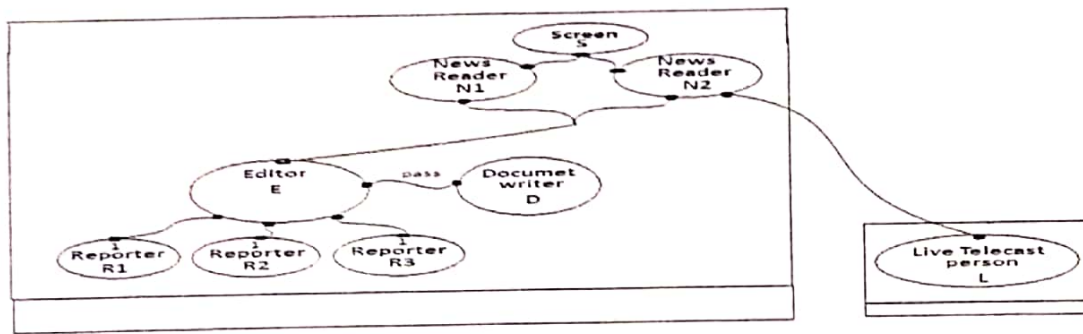
FAS
FEN

static struct file_ops simple; obj-m = source-file-name.o make -C KERNEL HDD BUILD
 .owner = THIS UUCDAD PPN SYSTEM FOLDER
 .read = AEIPEBSAN H = 'pwd' module/clear
 make load
 rat /dev/

Consider the following different processes at Nitw-News Channel Studio as shown in sample figure below. Editor(E) gets news from Reporters(R). Reporters type news through keyboard and send to standard output, which in turn goes to Editor. Whenever Editor receives a news, he sends the news to News Reader's table. The News Readers N1 and N2 reads the news alternatively, i.e. arrange to display the news onto the Screen. (A news will be displayed only once onto the screen). If a News Reader notices a decimal number(port address) in the start of news content, then it gets connected to a Live telecaster(L) whose IP address is IP₅, and the noticed port number. After connecting, the News Reader arranges to echo onto the screen, whatever it gets from Live telecaster. At this moment the other News Reader should not read any news as live telecast is going on. Once live telecast is over, the news reading will be done alternatively by N1 and N2 as usual. The News Reader who has got connected to live telecast should also notify the Editor, so that the editor will maintain a total count of live telecasts at any moment. This count can be seen/know by anybody in the studio. If Editor notices a news message with prefix "/d" from any of the Reporters, then it passes that Reporter to Document Writer(D). The Document Writer stores the news messages that it gets from the Reporter in a file(document).

First mention clear steps and then write Pseudo-code/ Sample Code for all the different type of processes involved in this News Channel Studio scenario.

You must have to use all the IPC (Inter Process Communication) mechanisms, 90% of I/O multiplexing, required BSD socket system calls and other suitable system calls.



5. **Facilitator Super Server:** A Facilitator super server process – F, Service server process – S_i will be running in the same computer system. All Client processes – C_i are in different computer systems. 5

Process F initially does not contain any service points (sfd_s), but opens only one well-known(port) connectionless sfd. A developer codes S_i.C or S_i.CPP keeping in mind the working logic of process F. A user/developer types input into the process F in the format of (port number(m), /pathname/S_i.exe) soon after he stores/loads the S_i.exe file in the pathname. Process F reads this input and creates the process S_i. From then onwards, process S_i is ready to serve clients on port number m. Now process F includes a new service point, i.e. sfd_i into the existing service points, i.e.. sfd_s. This new sfd_i is for this particular service S_i. All S_i services are connection-oriented only. That means, process F supposes to facilitate services (S₁, S₂, S₃, ..., S_n) by listening to n socket fds. As soon as a client connect request arrives for a service (say S_i), {in other words, as soon as process F observes request for service S_i}, process F notifies process S_i. Then process S_i takes care of the client to serve by a service function thread.

(Hint: setsockopt(sfd, SOL_SOCKET, SO_REUSEADDR || SO_REUSEPORT, &temp, size(int)) enables port reusability).

A client can know the list of services available at process F, by sending an enquiry message to the well-known port of F. The process F sends the list. Further, whenever a new sfd_i gets added, process F sends a message about this new sfd_i (i.e its port number and brief service description of S_i) to all the clients who have contacted/consulted it so far.

First write clear steps, then write program/pseudo code program for process F and process S_i (a simple service functionality) with proper system calls.



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, WARANGAL
III B. Tech (Computer Science & Engineering) II Semester
Mid Semester Examinations, 2018-2019
CS351 LANGUAGE PROCESSORS

Date: 25-02-2019

Time: 2 Hours

Max. Marks: 30

N.B.: Answer ALL questions

- 1) Find LR(0) items for the following expression grammar and construct SLR table assuming that the operators '+' and '*' are right associative and + has higher precedence than *
 $E \rightarrow E + E \mid E * E \mid (E) \mid id$
- 2) Consider the grammar
 $lexp \rightarrow atom \mid list; atom \rightarrow num \mid id; list \rightarrow (lexp_seq);$
 $lexp_seq \rightarrow lexp_seq lexp \mid lexp$
Remove left recursion, find first and follow sets for the non-terminals and construct LL(1) parsing table. Show the actions of the LL(1) parser on the input (a (b (2)) (c))
- 3) Consider the grammar $E \rightarrow (L) \mid a; L \rightarrow E L \mid E$. Construct the DFA of LR(0) items and hence construct DFA of LALR(1) items by propagating the lookaheads through the DFA of LR(0) items. Construct LALR (1) parsing table.
- 4) Let synthesized attribute val give the value of binary number generated by S in the grammar $S \rightarrow L.F \mid L; L \rightarrow LB \mid B; F \rightarrow FB \mid B; B \rightarrow 0 \mid 1$. Use synthesized attributes to determine S.val. (Note: Right side of production for S is L(dot)F generating a fractional number)
- 5) Write Yacc specifications for a simple integer calculator using the operators +, -, *, / (int division), % (mod) and ^ (exponentiation)
- 6) Write an unambiguous context free grammar to generate all binary expressions using the operators +, *, ^ (exponentiation) and the usual precedence relations and associativity rules. Assume that all operands are integers. Using the grammar, show how the following statement gets transformed at the end of each phase of a compiler. At the end of parsing phase, identify the attributes to evaluate the value of the expression, find the dependency graph and determine the evaluation order to find the intermediate code. Clearly state all assumptions made.

$alpha^a a^3 + (beta + Charlie + delta)^2 + d * e * 20$



NATIONAL INSTITUTE OF TECHNOLOGY-WARANGAL
SCHOOL OF MANAGEMENT

Open Elective to M.B.Tech. II-Semester

SUBJECT: MARKETING MANAGEMENT (SM390)
Mid Semester Examination

Date: 02-March-2019

Time: 10 AM to 12:00 PM

Max.Marks: 30

Answer all the questions

1. Explain the model of Holistic marketing. How are such marketing approaches useful to companies and customers? (4M)
2. How do you frame out BCG Matrix of technological companies? Explain with evidence of any product portfolio of one company from the same industry. (6M)
3. In a monopolistic competitive market, what kind of market segmentation pattern follows? Explain with appropriate cases (4M)
4. How do you differentiate types of consumer behaviour according to Maslow's need Hierarchy theory? Justify with examples. (6M)
Self system actualization
Esteem
Belongingness
Safety
Psychological
5. Write a short note on (Each question carries 2 M)
(5×2=10)
 - a. Corporate vision and mission
 - b. Two-dimensional, 3 x 3 grid
 - c. Marketing Intelligence System
 - d. PESTL
 - e. Service mix P's

Complex buying
Desire
Variety
Habitual

Integrate
Comm
Infor

Un Diff
the diff
Core
Personal

Look
Personal safety

Car
Mob
Kid
Civil

1671210
input type="text"



NATIONAL INSTITUTE OF TECHNOLOGY, WARANGAL
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
MID EXAMINATION, 28th FEB 2019
III B.Tech – CSE (II Sem)
Web Technologies

Time: 2 hour

Max. Marks: 30

Answer ALL questions:

1. Consider following JavaScript code in which variable 'a' contains a list of items (4)

```
<script type="text/javascript">
    var a = ["cabbage", "onion", "milk", "sugar", "tea"];
</script>
```

Write a Program to

- (a) Add "bread" and "butter" after milk in the list,
- (b) Remove "cabbage" from the list,
- (c) Replace "onion" with "cheeze" and "jam"

2. Discuss CSS animations with an example.

3 x 15 = 45
20
35
[5]

100-20
80
16
16

3. A Parking Garage Charges Rs.20 minimum fee to park for up to three hours. The garage charges an additional Rs.5 per hour for each hour or part thereof in excess of three hours. The maximum charge for any given 24-hour period is Rs. 100. Write a Script that calculates and displays the parking charges for each current customer who parked a vehicle in this garage. You should input from the user the hours parked for each customer. Use a text input field to obtain the input from the user. The program should use the function CalculateCharges to determine the charge for each customer. [6]

UI
HPE Com
RHLon
SDS
330
DPor

4. Write a program that inputs a line of text, tokenizes it and displays the tokens in reverse order. Use Dialog boxes for input and output. [4]

Example Output:

The Original String is: JavaScript is a Client side Scripting Language

The reversed string is: Language Scripting side Client a is JavaScript

5. What is form validation? Write a Script to validate your name and phone number. [5]

6. Write a Script to convert distance in Kilometers or miles to meters or inches i.e., the user may give the input in Kilometers or Miles and may be asked to convert into meters or inches. (1 KM = 1000 meters or 39370.1 inches; 1mile = 1609.34 meters or 63360 inches) [6]

Use text input field to input a value and use two dropdown menus (First one for selecting either Kilometers or miles and the second one for selecting meters or inches).

<select name="type">
 <option>

SEBSP
2x1000
dist x1000

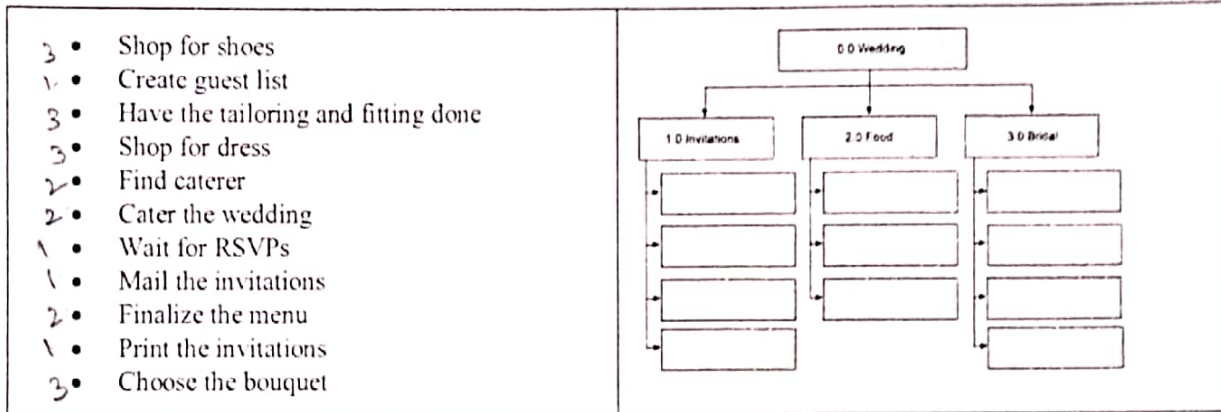


NATIONAL INSTITUTE OF TECHNOLOGY, WARANGAL
(The Institution of National Importance)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
I- MID EXAMINATION, MARCH, 2019
B.Tech- III Year (CSE), II- Semester

CS371 - SOFTWARE METRICS AND SOFTWARE PROJECT MANAGEMENT

Answer all the following Questions Time: 2 Hours Date: 01-03-2019 Max Marks :30

1. Arrange the following activities into the Work Breakdown Structure (WBS) given below. Further, you have to identify the necessary relationships between the activities with appropriate diagram. 3



16. Assuming that you are preparing a "House for Sale", in this regard you have to identify the activities and arrange them in Work Breakdown Structure. 3

2. Construct a precedence diagram. 6
- On the diagram, compute the four schedule dates (ESD, EFD, LSD, LFD) and the four floats (TF, FF, INTF, and IDE) for each activity, and the lag for each link.
 - Identify the critical path

ACT	DUR	PREDECESSORS
B	5	IKD
M	4	B
N	9	B
X	15	B
A	5	M,N
F	6	N,X
Q	2	X
C	4	X
Y	10	A
S	10	F,A
R	2	Q,F
T	5	C,Q
K	7	Y,S,R
U	3	K,T

3. An Institute Campus Network faced a bit of troubles in their Datacenter when their Main Server crashed out-of-blue, resulting no internet facility on campus and all account transactions were blocked. Assume that you are a network administrator and your college administration asked to do Root Cause Analysis for the server crash. Explain your approach in doing root cause analysis for at least 3 levels. 6
4. Assume that you're asked to develop an software for Institute Library in which, one of the features to have an online public access catalog (OPAC) for the Patrons of a library who can search library catalog online to locate various resources such as books, periodicals, audio and visual materials, or other items under control of the library. Patrons may reserve or renew item, provide feedback, and manage their account. Estimate the effort using usecase point approach. 6
5. An University intends to procure an integrated student management system holding all details of registered students including personal information courses taken and examination marks achieved. The alternative approaches to be adopted are either: 6
- Buy a database management system and develop an in-house system based on this database.
 - Buy a system from another university and modify it local requirements.
 - Join a consortium (partnership) of other universities, establish a common set of requirements and construct a software house to develop a single system for all of the universities in the consortium.
- Identify two possible risks in each of these strategies and suggest techniques for risk resolution which would help in deciding which approach to adopt.