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Assalam-o-Alykum VU Students,

This is MS Rehman from MS-Team, and I hope you are all doing well. As you all know, we have been providing assistance to VU students through our virtual university WhatsApp groups and communities for quite some time now.

Currently, many of you are preparing for the final term exams, and we understand the importance of having access to previous years' papers to prepare effectively. That's why we have created a special group named "Final Term current papers," where we are collecting papers from various sources and sharing them with you all.

We also understand the significance of keeping these papers for future use, which is why we are creating video files of these papers and uploading them on our channel "MS CreatiVePlatForm" for your convenience. We are also compiling all the papers of each date and subject into separate files to make it easier for you to find and use them.

I would like to take this opportunity to thank the entire MS-Team for their tireless efforts in providing assistance to VU students. We are a group of dedicated individuals who believe in helping students achieve their academic goals. We provide support not only for exams but also for assignments, GDBs, and other academic activities.

- We hope that our efforts are helpful to you, and we encourage you to join our communities and groups to stay updated with the latest information and assistance.

  Best of luck for your exams.

  JazakAllah Khair.

As we continue on our academic journey

I humbly request your prayers for our team and the success of our shared goals.

May Allah bless **us** with the strength, guidance, and wisdom to achieve our academic pursuits, and may our efforts be fruitful and beneficial for ourselves and others.

Jazak Allah Khairan (may Allah reward you with goodness)."

Stay connected with us on our official accounts!

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EFFORTS by MS-Team



Important Note!

Some questions are concept-based, so finding exact answers directly from the slides or handouts was not always possible. Therefore, we have tried our best to search, analyze, and extract the most relevant material from the provided handouts or slides so that students can properly understand the concepts instead of simply memorizing answers.

For a few questions, additional explanations and guidance have also been incorporated with the help of ChatGPT and other learning resources to make the answers more comprehensive and easier to understand. However, our primary effort has been to keep the content aligned with the course handouts, slides, and concepts as much as possible.

We hope this file proves helpful to you. We have made every effort to provide the most relevant and authentic answers; however, since some questions may slightly differ from the actual paper or course material, we strongly recommend that students verify the answers according to their own handouts, slides, and understanding before using them.

May Allah grant us all success, ease our efforts, and bless us with wisdom, patience, and perseverance. Keep your faith strong, because with prayer and hard work every difficulty becomes easier. We also request you to remember us in your prayers.

Thank you, and best of luck with your exams!

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Short question

Q: Which state is called terminal in transition system?

Terminal State

Question

State s in transition system TS is called terminal if and only if Post(s) = Ø.

Q: Truth table tha us k 1 column ki value find krni thi?

How to construct a Truth Table

- Consider, for example, the proposition ¬(p∧¬q). Following is the truth table of ¬(p∧¬q)

p	q	$\neg q$	$p \wedge \neg q$	$\neg(p \wedge \neg q)$
T	T	F	F	T
T	F	T	T	F
F	T	F	F	T
F	F	T	F	T

- First columns of the table are for the variables p, q, . . . and that there are enough rows in the table, to allow for all possible combinations of T and F for these variables. (For 2 variables, as above, 4 rows are necessary; for 3 variables, 8 rows are necessary; and, in general, for n variables, 2^n rows are required.)

Q: Formal specification Ka mathematically model?

How can we use formal Methods?

- Modeling
  - Models describe the actual product behavior (before implementing it) through some symbols/notations etc.
  - A model is a simplified representation. It may skip the irrelevant properties
  - A mathematical model that represents the intended behavior of a program can be used as a formal specification

Q: In Transition system Act and AP meant?

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Transition Systems

- A transition system TS is a tuple (S, Act, →, I, AP, L) where
- *S is a set of states,*
- *Act is a set of actions,*
- *→ ⊆ S × Act × S is a transition relation,*
- *I ⊆ S is a set of initial states,*
- *AP is a set of atomic propositions, and*
- *L : S → 2^{AP} is a labeling function.* ksi bi state ko ksi b propositionn k sth attach krta ha

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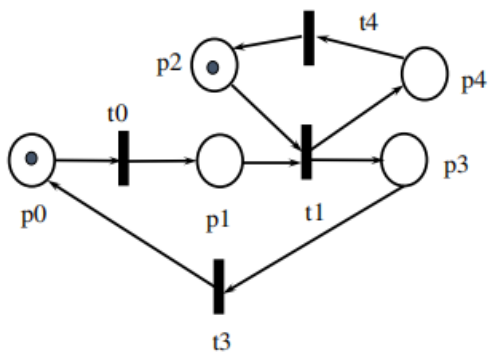
Q: implications ka truth table ta yh ..?

The implication operator (Truth table)

P	Q	P ⇒ Q
T	T	T
T	F	F
F	T	T
F	F	T

Q: Differentiate between enabled and disabled transition?

Petrinets



- A transition can be fired when there is at least one token on each of the transition's input places
- When a transition is fired it one token is removed from each of its input places and produced a single token on each of its output places.
- A transition that is able to fire is said to be enabled and otherwise disabled.
- If there is more than one enabled transition any one of enabled transitions may be the next one to fire.

Q: Label of condition transition what is meant by?

Data Dependent Systems

- **The executable actions of a data-dependent system typically result from conditional branching, as in**
  - **if x%2 = 1 then x := x + 1 else x := 2·x fi. In**



- Labels of conditional transitions are of the form $g : \alpha$ where g is a Boolean condition (called guard), and α is an action that is possible once g holds.

Q: Klee and plus operates identity?

Kleene Star Closure

- Given Σ, then the Kleene Star Closure of the alphabet Σ, denoted by Σ*, is the collection of all strings defined over Σ, including Λ.
- Examples:
- If Σ = {x} Then
- Σ* = {Λ, x, xx, xxx, xxxx, ...}
- If Σ = {0,1} Then Σ* = {Λ, 0, 1, 00, 01, 10, 11, ...}
- If Σ = {aaB, c} Then Σ* = {Λ, aaB, c, aaBaaB, aaBc, caaB, cc, ...}

Long question

Q: 5 tuple ki terms wala question tha?

Deterministic Finite Automata

- A DFA is a 5-tuple, (S, ∑, T, s, A)
  - S represents finite set of states
  - ∑ represents set of input symbols
  - T set of transitions
  - s ∈ S represents initial state
  - A ∈ S repreents final state

Q: Formal specification ki advantages?

Advantages of formal methods

- Formal specifications can help considerably in generating suitable test cases.
- Formal specifications allow for feedback on system specifications at early development stages
- Important properties (such as internal consistency) of the initial specification can be checked mathematically
- A proof of program correctness can be constructed
- Proofs can help uncover design errors as soon as they are made

Q: Sdlc k phases write name?

Software Development Life Cycle (SDLC)

Software Development Life Cycle (SDLC) is a systematic approach to developing software applications.

- Software increasing in size and complexity
- *A Systematic approach is required called SDLC*
- *Requirement Specification*
- *Design*
- *Coding*
- *Deployment*

Q: effect function ki example Jo hai handouts MN wo wali the ,affect function find krna ta?

Data Dependent Systems

Action	Effect
refill	$nsoda := max;\ nbeer := max$
sget	$nsoda := nsoda - 1$
bget	$nbeer := nbeer - 1$

action previous new

- *Effect* : *Act* × *Eval*(*Var*) → *Eval*(*Var*)
- which indicates how the evaluation η of variables is changed by performing an action. If, e.g., α denotes the action $x := y+5$, where x and y are integer variables, and η is the evaluation with $\eta(x) = 17$ and $\eta(y) = -2$, then
- *Effect*$(\alpha, \eta)(x) = \eta(y) + 5 = -2 + 5 = 3$, and *Effect*$(\alpha, \eta)(y) = \eta(y) = -2$.

Q: de Morgan's law ka truth table bana tha?

De Morgan's Laws ke do main forms hotay hain:

1. ¬(A ∧ B) = (¬A ∨ ¬B)
2. ¬(A ∨ B) = (¬A ∧ ¬B)

Neeche dono ka truth table diya hai:

---

1) ¬(A ∧ B) = (¬A ∨ ¬B)

A	B	A ∧ B	¬(A ∧ B)	¬A	¬B	¬A ∨ ¬B
0	0	0	1	1	1	1
0	1	0	1	1	0	1
1	0	0	1	0	1	1
1	1	1	0	0	0	0

2) ¬(A ∨ B) = (¬A ∧ ¬B)

A	B	A ∨ B	¬(A ∨ B)	¬A	¬B	¬A ∧ ¬B
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0

Q: model checking ke 5 advantages?

Strengths of Model checking

- Wide range of applications
- *It supports partial verification*
- *Its not vulnerable to likelihood that an error is exposed*
- *It provides diagnostic information in case a property is invalidated*
- *It is a potential "push-button" technology*
- *It enjoys a rapidly increasing interest by industry;*

Q: petri nets mein places, transitions,arc,tokens ko kin symbles se denote kartey hein?

Petri nets

QIUZ

- Tow main components are Places and transitions.
- Place (Represents condition or State) denoted by Circle



- Transition (Represents Events) denoted by Rectangle, Vertical bar or filled vertical rectangle



- Arc (connect Transitions and Places) denoted by directed arrow

Q: Ak DFA 5 tuple wlaa tha?

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Thank you for your valuable time

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Best Regards : MS-Team

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