<u>H</u> ;	ssignment	No. 02	Date: / /
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0.1	Solve the following with forward chaining or
	backward chaining or resolution (any one) use
"mano")	predicate logic as language of knowledge repre-
	sentation clearly specify the facts & inference
	rule used A bold Timber (1) bell vice
	Eilen beliefer ver ind et for 80 meet 1 18 de la
Q·1]	Example 1: d. 1) and cally of more 1 years
	Every child sees some witch No witch has both
	a blank cat & a pointed hat.
2]	Every witch is good or bad.
3	Every child who sees any good witch gets andy.
4	Every witch that is had has a black cat.
5]	Every witch that is seen by any child has a
	pointed hat
	Prove: Every child gets candy.
\rightarrow	A) facts into fol
	i) 7 x AY (child: (x), witch (y) -> Sees (x, x))
O Mari	m 7 Y (witch (Y) -> has (Y, black cat) 1 has
	(Y. pointed hat)
	2) Fr (witch (Y) -> good (y) V bad (y)).
	3) Fx ((Sees (x, r) -> (witch (y) -> good (y,)) ->
(get (x, (andy)
	47 EY ((witch (y) -> bad (y)) -> has (y -> black hat)) 5> EY (sees (x,y) -> has (Y, pointed hat)
	5> EY (gees (x,y) -> has (Y, pointed hat)
	B) FOL into CNF.
	i) I xAx (child (x), witch (y) -> Sees (x, Y))
	-> v = y, (witch (y) -> has (r, black hat)
	-> vn 7x (witch (y) -> has (r, pointed, hat).

. 1	2) 4y (witch (y) -> good (y))
,	Yr (witch (y) → bad (y))
	3) Fx [(sees (x, r) -> witch (y) -> good (y)) -> gets(x, andy)
	=> Ex [(Sees (x, good (y) -> gets (x, candy))
	4> Ex [bad (4) -> has (Y, black hats)]
	5> Ex [seen (x, x) -> has (x, pointed hat)]
	> n yr [seen (x, y) -> has (r, plack hat)]
	part does a residence somber eran blide process
	c> "a! == 1 grin. = 1, han distil !
	Sees (X,Y) witch (Y) V Sees (X,Y)
	tgood V badly 3
7	the delite a serie of the state and the
į.	Msein [xi (good) A sees (x, bad) has (Y1Z)
	FY. (good V bad 3
	£ Z/ black cqt V
	pointed hat) }
	Seen (X, good) V Seen (X, bad)
	has (good, pointed
	hats V get [x, candy]
	Seen (x, good) V has (good,
	pointed hat) V gets Seen (x, good) V
	(x, candy) gets (x, candy)
	lossed in the Control of the Control
	Marine Marine Marine Sept Miles
	gets (x, candy) gets (x, candy)
	100 - Elight Condation is resident with the
	- 1 1 1 dd 1 1) and a fall discoll vi or 1 -
	The state of the s

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2	Example 2!
	il Every boy or girl is a child
	2] Every child gets 9 doll or 9 train or 9 lump
	of coaling
	3 No boy gets any doll.
	4] Every child who is bad gets any lymp of
	Coq!
227	5) No child gets a train
•	France: Ram is bad.
	7) Prove: Ram is bad.
\rightarrow	1) 4 x (boy (x) or girl (x) > child (x))
	2 yy (child (y) → gets (y, doll)or gets (y, train)
	or gets (y, coal)
	3) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	4) for all Z (child (z) and bad (z)) -> gets (z, coal)) Yy child (y) -> ! gets (y, train)
	5] child (ram) -> arts (ram coal)
	5) child (ram) -> gets (ram, coal) To prove (child (ram) -> bad (ram))
	CNF Clayses
]! boy (x) or child (x)
	i girl (x) or child (x)
	2] ! child (y) or get (y, doll) or
	2] ! child (y) or get (y, doll) or gets (y, et coal)
	3] [boy (w) or ! gets (w, doll)
	3] [boy (ω) or ! gets (ω, doll)
	5) 1 child (ram) -> gets (ram, coal)
	G. had (ram)

	Resolution
	A) ! child (2) or ! bad (2) or get (2, coal).
	of bad (rigm)
	7] ! child (ram) or gets (ram, coal)
	Substituting 2 by ram
2	1) (a) 1 boy (x) or child (x)
	boy (ram)
	8] child ram I substituting x by ram) 1] ! child (ram) or gets (ram, coal)
	1] ! child (ram) or gets (ram, coal)
	8] child (ram)
	g gets (ram, coal)
	I i child (y) (or gets (y, doll) or gets (y, train) or
ň	gets (y, coal)
	8) Child (ram)
	10] gets (ram, doll) or gets (ram, train) or gets
	(ram (coal)
	C Substituting y by ram)
	9] gets (rgm, coal)
	10] gets (ram, doll) or gets (ram, train) or gets.d
	(rgm, coal)
	17 gets (ram, doll) or gets (ram, coal)
	3] ! boy (w) or ! gets (w, doll)
	5] boy (ram)
	12] ! get (sqm, doll) (substituting w by sqm)
	in gets (ram, doll) or gets (ram, train)
	12) 1 gets (ram, doi)
	13) gets (ram, coal)
	c) <a> get (rgm, cogl)
	(3) gets (rgm, cog)
	Hence, bad (ram) is proved.
	' '

0.2	Differentiate between STRTPS and ADL		
2 88	Laster Landill No. 12 Confe		
r the of the	STRTPS language	ADL	
The lates			
λ	Only 91100 positive	1) Can Support both positive	
	literals in the States.	a negative literals	
	for eg : A valid Sentence	for eg: - same sentence	
oi.	is STRIPS is expressed as	is expressed as =>	
	> Intelligent 1 Beautiful.	stupid N- ugly.	
	it ist ranger to the top	in the first and in	
<u>allei</u>	2 STRIPS Stands for Standard	2) Stands for Action	
	Research Institute problem	Description Language.	
	Solver.	. (J J	
	3 Makes use of closed	3 Makes use of open	
	world assumption (i.e.)	world Assymption (i.e.)	
	an mentioned literals	unmentioned literals	
-	gre false.	are unknown.	
		•	
6	1 We only can find ground	1 We can find qualified	
	literals in goals.	Variables in goal.	
	for eg: - Intelligent 1	for eg: - 7xAt[P!x]	
	Begytiful.	1 At (P2, x) is the	
		goal of having P1 & P2	
		in the some place in	
		the example of blocks	
	80		
	5 Goals are conjunctions	6) Goals may involve conjun-	
	for eg: - (Intelligent A	ctions & disjunctions for	
	Begutify)	eg:- (Intelligent 1	
		(Beautiful NRich))	

		Full Shibiters
	6 Effects gre Conjunctions	@ Conditional effects are
	127	allowed when P: F means
		Fis an effect only if
5-16-12	· It is a many in the world	P is satisfied
	ar a fil and on the section	· · · · · · · · · · · · · · · · · · ·
2.513	7 Does not support	7 Equality Predicate
	equality.	CX = 4) is build in.
	pier vi invii - Whyte	The standing of the standing o
	8 Des not have support	8 Support for types
	for types	for eg: The variable
Ť.	En instrument instrum	P: person
		, m, j. 2.
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130 L	the state was love and close to de pende in
0.4	You have two neighbors J&M, who have promised
and will	to call you at work when they here the glarm.
man for	I always calls when he hears the glarm, but
	sometimes confused telephone ringing with
	glarms & calls then too. M likes loud music &
	sometimes misses the alarm together. Given, the
111	evidence of who has or has not called : we would
	like to estimate the probability of burglary. Draw
- 1.11	a Bayesian network for this domain with
	Suitable probability table.
rk e	at and the case of the decident provides off.
\longrightarrow	P(B)
	[0.00] (Burglary) (Earthquake) [0.002]
of a const	was the state of t
- NT	
e pred a	(Alarm) B E P(A)
	F T 0-95
9	T F 0-94
-	F T 0:29
ay you "	F F 0:00
<u> </u>	(John (mary)
2.30	calls calls
	The state of the s
·	A PCT) A PGM).
5(+10	T 0.09.
	F 0.05
	The topology of the network indicates that - Burglary & earthquake affect the probability of
	- Dyrglary & earthquake affect the probability of
	. The alaxms going off.

_	
	- whether John and Mary call depends only on
	alarm.
	- They do not perceive any bunglaries directly they
,	do not notice minor earthquakes and they do
	not confer before calling
	2] Mary listening to loud music & John confusing
	phone ringing to sound of alarm can be read
1	from network only implicitly as uncertainly
,	associated to calling at work
	3) The probability actually symmarize potentially
	infinite set of circumstances
	- The glarm might full to go off due to high
	hymidity, power failure idead battery, cut wires,
	a dead mouse stude înside the bell, etc.
	- John and mary might fail to call and report
	& glarm because they are out to lynch, an
	vacation, temporarily deaf, passing helicopter,
	etc.
	1) The condition probability tables in new gives
	probability for values of random variables
_	depending an combination of values for the
	parent nodes
	3 Each row must be sym to 1, because entries
	represent exhaustive set of cases for variable
	6) All variables are Boolean
	I In general , a table for a Boolean variable with
	k parents contains 21 independently specific
	probabilities.
	8) A variable with no parents has only one row,
	representing prior probabilities of each possible
	value of the variable.

3) Every entry in full joint probability distribution can be calculated from information in Rayessian network. 10) A generic entry in joint distribution is probability of a conjunction of particular assignments to each variable P(XI = XI A A Xn = Xn) abbreviated as PC X1,, Xn) ii) The value of this entry is P(X1,, Xn) = Ti-1, np(1, parents (xi)), where parents s(xi) denotes the specific values of the variables parents (xi) - PCJAMAGANBANE) = P(jla) P(mla) P(alubane) P(ub) e(ue) = 0.09 x 0.07 x 0.001 x 0.999 x 0.998 = 0.000628 12] Baysesian Network mary John <u>ca115</u> C9/15 Farthquake Burglary Alarm