Stude	ent ID:		Duration: 15 m	ins	Date: 05/04/2023
Student name:					
_		Find the MGU for each of th Otherwise, write No MGU a	e following pairs of clauses. If the	ere exi	sts such an MGU, write
a.	P(F(A), G(y)) and P(x, x)	where A is a constant symb	ool	
b.	P(B, x, F(0	G(z))) and P(z, F(y), F(y))	where B is a constant symb	ool	
Ques	tion 2 (2pts	s) Translate the following se	ntences from English to First-or	der lo	gic.
No.	Score (pt)	Sentence	0		<u>, </u>
1	0.25	Truffle is an edible mushro	oom, and it is not colorful.		
2	0.25	All mushrooms grow in so	me forests.		
3	0.25	There are some forests in	which no edible mushroom grov	NS.	
4	0.25	No mushroom grows in all	forests.		
5	0.5	There is exactly one colorf	ful mushroom.		
6	0.5	Each mushroom is colorfu	l or edible (but not both at the s	ame ti	me).
using	only the giv	en predicates			
•		•	Edible(x): x is edible	• F	orest(x): x is a forest
•	Truffle is a				rows(x, y): x grows in y
1.					
2.					
3.					
4.					
5.					
6.					
0.					

Student ID:				Duration: 15 mins	Date: 05/04/2023		
Student name:					Score: <u>/ 3</u>		
the su		. Otherwise, write No M			exists such an MGU, write		
b.	Q(A, G(x, A	A), F(y)) and Q(A, G(F(I	B), A), x) who	ere A and B are consta	ant symbols		
Ques	tion 2 (2pts) Translate the followin	ng sentences from	English to First-order	· logic.		
No.	Score (pt)	Sentence					
1	0.25	Taiga is forest, but it is					
2	0.25		Each forest has some ferns growing in there.				
3	0.25		There is some fern that grows in no tropical forest.				
4	0.25	There is no forest in which all ferns grow.					
5	0.5	There are at least two dense forests.					
6	0.5	Each forest is tropical or sparse (but both at different times).					
using	only the giv	en predicates					
•	Fern(x): x	•	• Tropical	(x): x is tropical •	Forest(x): x is a forest		
•	Taiga is a		•): x is dense •	Grows(x, y): x grows in y		
	O				(7,7) 0		
1.							
2.							
3.							
4.	**************						
5.							
٦.	•••••	••••••					
6.	*******						

Student ID:			Duration: 15 mins	Date: 05/04/2023			
Student name:				Score:/_3			
-		Find the MGU for each of the foll D. Otherwise, write No MGU and ju		xists such an MGU, write			
a.	F(G(A, x),	G(y, y)) and F(G(A, B), G(F(A), F	(z))) where A and B are co	nstant symbols			
b.	Q(A, y, x)	and Q(x, B, F(y))	where A and B are co	nstant symbols			
Ques	tion 2 (2pts	5) Translate the following senten	ces from English to First-order l	ogic.			
No.	Score (pt)	Sentence					
1	0.25	Margherita is a cheesy pizza, bu	ıt it is not spicy.				
2	0.25	•	Each café serves some pizzas.				
3	0.25		Some cafés serve no spicy pizza.				
4	0.25	There is no pizza that all cafés serve.					
5	0.5	There is exactly one spicy pizza	l.				
6	0.5	Each pizza is spicy or cheesy (but not both simultaneously).					
using	only the giv	ren predicates					
•	Pizza(x): x	-	Spicy(x): x is spicy •	Cafe(x): x is a café			
•		-		Serves(x, y): x serves y			
1.							
2.							
3.							
4.							
5.							
6.							

Student ID:			Duration: 15 mi	ns Date: 05/04/2023			
Student name:				Score:/_3			
the su	ibstitution 6). Otherwise, write No MGU	and justify your	answer.	ere exists such an MGU, write		
d.	r (Colls (C	ons(A, B))) and F(Cons(C	lons(x, N)))	where A, b, an	u in are constant symbols		
b.	Q(C, F(x),	y) and Q(x, F(z), G(z, z))		where C is a c	onstant symbol		
Ques	tion 2 (2pts	s) Translate the following s	entences from Er	nglish to First-oro	der logic.		
No.	Score (pt)	Sentence					
1	0.25	Buffalo is a spicy pizza, ar	nd it is not a topp	ing.			
2	0.25	All pizzas contain some to					
3	0.25	Some pizzas contain no cheesy topping.					
4	0.25	There is no topping that all pizzas contain.					
5	0.5		Buffalo pizza contains at least two toppings.				
6	0.5	Some topping is cheesy or contained in Buffalo (but not both at the same time).					
using	only the giv	en predicates					
•	Pizza(x): x	-	Spicy(x): x is sp	oicy •	Topping(x): x is a topping		
•	Buffalo is	constant	Cheesy(x): x is	cheesy •	Contains(x, y): x contains y		
1.							
2.							
3.							
5.							
4.							
5.							
Э.							
6.							

SOLUTION

Stude	ent ID:	Duration: 15 mins	Date: 05/04/2023
Stude	ent name:		Score:/ <u>3</u>
-		Find the MGU for each of the following pairs of clauses. If there ex . Otherwise, write No MGU and justify your answer.	ists such an MGU, write
c.	P(F(A), G(y)) and P(x, x) where A is a constant symbol	
	No MGU. V	Ve cannot unify x with both F(A) and G(y), these two predicates are n	ot unifiable.
d.	P(B, x, F(C	(z)) and $P(z, F(y), F(y))$ where B is a constant symbol	
		/F(y), y/G(B) }	
Ωυσε	tion 2 (2nts	Translate the following sentences from English to First-order lo	ogic
No.	Score (pt)	Sentence	igic.
1	0.25	Truffle is an edible mushroom, and it is not colorful.	
2	0.25	All mushrooms grow in some forests.	
3	0.25	There are some forests in which no edible mushroom grows.	
4	0.25	No mushroom grows in all forests.	
5	0.5	There is exactly one colorful mushroom.	
6	0.5	Each mushroom is colorful or edible (but not both at the same ti	ime).
using	only the giv	en predicates	
•	•	•	Forest(x): x is a forest
•	Truffle is a	constant • Colorful(x): x is colorful • (Grows(x, y): x grows in y
7	Muchroom	(Truffle) & Edible(Truffle) & Colorful(Truffle)	
7.	iviusiirooiii	(Truffle) ∧ Edible(Truffle) ∧ ¬Colorful(Truffle)	
8.	∀x Mushro	$pom(x) \rightarrow [\exists y \ Forest(y) \land Grows(x, y)]$	
9.	∃x Forest(x	$) \land [\forall y \; Mushroom(y) \land Edible(y) \rightarrow \neg Grows(y, x)]$	
10). ⊣∃x Mushr	$coom(x) \wedge [\ \forall y\ Forest(y) \rightarrow Grows(x,y)\]$	
		om(x) \land Colorful(x) \land [\forall y Mushroom(y) \land \neg (x = y) \rightarrow \neg Colorful(y)]	
11	x wiusiiio	$\frac{\text{OUII}(x) \land \text{Colorral}(x) \land [\lor y] \text{Musilioo}([(y) \land \neg (x - y) \rightarrow \neg \text{Colorral}(y))]}{\text{Colorral}(x) \land [\lor y] \text{Musilioo}([(y) \land \neg (x - y) \rightarrow \neg \text{Colorral}(y))]}$	
12		$pom(x) \rightarrow Colorful(x) \leftrightarrow \neg Edible(x)$	

Stude	ent ID:		Duration: 15 r	nins	Date: 05/04/2023
Stude	ent name:				Score:/ <u>3</u>
-	` - /		e following pairs of clauses. If t	here	exists such an MGU, write
		Otherwise, write No MGU	and justify your answer.		
C.	P(x, x) an	d P(z, F(z))			
	No MGU. V	Ve can not unify x with both a	and F(z), which are not unifiable	e.	
d.	Q(A, G(x, A	A), F(y)) and Q(A, G(F(B), A	a), x) where A and B are c	onsta	nt symbols
	$\theta = \{ x/F(B) \}$, y/B }			
Ouos	tion 2 (2nte	Translate the following co	ntences from English to First-o	ordor	logia
No.	Score (pt)	Sentence	intences from English to First-C	nuei	iogic.
1	0.25	Taiga is forest, but it is ne	ther tropical nor dense.		
2	0.25	Each forest has some fern			
3	0.25	There is some fern that gr			
4	0.25	There is no forest in which			
5	0.5	There are at least two dense forests.			
6	0.5	Each forest is tropical or s	parse (but both at different tir	nes).	
using	only the giv	en predicates			
•	Fern(x): x	is a fern	• Tropical(x): x is tropical	•	Forest(x): x is a forest
•	Taiga is a	constant	Dense(x): x is dense	•	Grows(x, y): x grows in y
7	Forest/Taig	;a) ∧ ¬Tropical(Taiga) ∧ ¬De	aco/Taiga)		
7.	i oresit raig	a) // ¬ITOpicai(Taiga) // ¬Dei	ise(Taiga)		
8.	∀x Forest($x) \rightarrow [\exists y \ Fern(y) \land Grows(y)]$	<u>x)]</u>		
9.	∃x Fern(x)	∧[¬∃y Forest(y)∧ Tropical	<u>y) ∧ Grows(x, y)]</u>		
10). ⊣∃x Forest	$(x) \wedge [\forall y \; Fern(y) \rightarrow Grows(y)]$, x)]		
			Dense(y) $\land \neg (x = y)$		
1.	. <u> </u>	it(x) // Torest(y) // Dense(x) //	Delise(y) A ¬ (x - y)		
12	2. ∀x Forest($x) \rightarrow Tropical(x) \leftrightarrow Dense(x)$			

Stude	ent ID:		Duration: 15 mins	Date: 05/04/2023	
Student name:				Score: / 3	
State				7	
-			owing pairs of clauses. If there exis	ts such an MGU, write	
		Otherwise, write No MGU and ju		, ,	
C.	F(G(A, x),	G(y, y)) and $F(G(A, B), G(F(A), F(A))$	(z))) where A and B are cons	tant symbols	
	$\theta = \{ x/B, y/B \}$	⁽ F(A), z/A }			
d.	Q(A, y, x)	and Q(x, B, F(y))	where A and B are cons	tant symbols	
	No MGU. V	Ve can not unify x with both A and	F(γ), which are not unifiable.		
Oues	tion 2 (2nts	Translate the following centers	og from English to Einst order log	ia	
No.	Score (pt)	Sentence	es from English to First-order log		
1	0.25	Margherita is a cheesy pizza, bu	t it is not spicy.		
2	0.25	Each café serves some pizzas.			
3	0.25	Some cafés serve no spicy pizza.			
4	0.25	There is no pizza that all cafés s	erve.		
5	0.5	There is exactly one spicy pizza.			
6					
using	only the giv	en predicates			
•	Pizza(x): x	is a pizza • S	Spicy(x): x is spicy • Ca	ıfe(x): x is a café	
•	Margherita	a is constant • (Cheesy(x): x is cheesy • Se	rves(x, y): x serves y	
7	Pizza(Marg	herita) ∧ Cheesy(Margherita) ∧ ¬S	picy(Margherita)		
9.	∃x Café(x) /	$\wedge [\forall y \ Pizza(y) \land Spicy(y) \rightarrow \neg Serve$	es(x, y)]		
10). <u>¬∃x Pizza(</u>	$x) \land [\forall y \ Café(y) \rightarrow Serves(y, x)]$			
11	∃x Pizza(x)	\land Spicv(x) \land [\forall v Pizza(v) \land \neg (x = v)	→ ¬Spicy(y)]		
	manamman.				
12	. ∀x Pizza(x)	$) \rightarrow Spicy(x) \leftrightarrow \neg Cheesy(x)$			

Stude	nt ID:		Duration: 15 mins	Date: 05/04/2023		
Student name:				Score: /3		
	••••					
Ouest	tion 1 (1pt)	Find the MGU for each of the following pair	rs of clauses. If there exist	s such an MGU. write		
		Otherwise, write No MGU and justify your				
c.	F(Cons(Co	ons(A, B))) and F(Cons(Cons(x, N)))	where A, B, and N are o	constant symbols		
	No MGU. W	e cannot unify two different constants.				
d.	Q(C, F(x), y	y) and Q(x, F(z), G(z, z))	where C is a constant s	ymbol		
	$\theta = \{ x/C, z/$	<u>C, y/G(C, C) }</u>				
Quest	tion 2 (2pts	Translate the following sentences from E	nglish to First-order logi	С.		
No.	Score (pt)	Sentence				
1	0.25	Buffalo is a spicy pizza, and it is not a top	ping.			
2	0.25	All pizzas contain some toppings.				
3	0.25	Some pizzas contain no cheesy topping.				
4	0.25	There is no topping that all pizzas contain.				
5	0.5	Buffalo pizza contains at least two toppings.				
6	0.5 Some topping is cheesy or contained in Buffalo (but not both at the same time).					
using	only the give	en predicates				
•	Pizza(x): x	is a pizza • Spicy(x): x is s	picy • Toppin	g(x): x is a topping		
•	Buffalo is c	onstant • Cheesy(x): x is	s cheesy • Contain	ns(x, y): x contains y		
7.	Pizza(Buffal	o) ∧ Spicy(Buffalo) ∧ ¬Topping(Buffalo)				
		\rightarrow [\exists y Topping(y) \land Contains(x, y)]				
9.	∃x Pizza(x)	\land [\forall y Cheesy(y) \land Topping(y) \rightarrow \neg Contains	(x, y)]			
10	10. $\neg \exists x \ Topping(x) \land [\ \forall y \ Pizza(y) \rightarrow Contains(y, x)]$					
11	11. $\exists x \text{ Topping}(x) \land \text{ Topping}(y) \land \neg (x = y) \land \text{ Contains}(\text{Buffalo}, x) \land \text{ Contains}(\text{Buffalo}, y)$					
12	12. $\exists x \; Topping(x) \land [\; Contains(Buffalo, x) \leftrightarrow \neg Cheesy(x) \;]$					
12	· '''' '' '' '''''' '''''''''''	WWW.Transmentaling.WW.V. Journaling.				