Started on	Wednesday, 30 March 2022, 10:53 AM
State	Finished
Completed on	Wednesday, 30 March 2022, 10:58 AM
Time taken	5 mins 11 secs
Marks	0.74/4.00
Grade	**1.85** out of 10.00 (**18**%)

Question **1**

Partially correct

Mark 0.17 out of 1.00

Match simply typed lambda terms with their corresponding types.

λf:(Nat→Nat)→(Nat→Nat). iszero (f (f (λx:Nat. succ x)) 0)	(Nat→(Nat→Bool))→(Nat→Bool) ✗
λx:Nat. succ x	Nat ✗
λf:(Nat→Nat)→(Nat→Nat). f (f (λx:Nat. succ x)) 0	((Nat→Nat)→(Nat→Nat))→Nat ✓
λg:Nat→(Nat→Bool). if g 0 (succ 0) then g 0 else g (succ 0)	(Nat→Nat)→(Nat→Nat) ✗
(λf:(Nat→Nat). λg:(Nat→Nat). λx:Nat. if iszero (g x) then f x else g x) (λx:Nat. pred x)	((Nat→Nat)→(Nat→Nat))→Bool ✗
(λg:(Nat→Nat). g (g (g 0))) (λx:Nat. pred x)	Nat→Nat ✗

Your answer is partially correct.

You have correctly selected 1.

The correct answer is:

λf:(Nat→Nat)→(Nat→Nat). iszero (f (f (λx:Nat. succ x)) 0) → ((Nat→Nat)→(Nat→Nat))→Bool,

λx:Nat. succ x → Nat→Nat,

λf:(Nat→Nat)→(Nat→Nat). f (f (λx:Nat. succ x)) 0 → ((Nat→Nat)→(Nat→Nat))→Nat,

λg:Nat→(Nat→Bool). if g 0 (succ 0) then g 0 else g (succ 0) → (Nat→(Nat→Bool))→(Nat→Bool),

(λf:(Nat→Nat). λg:(Nat→Nat). λx:Nat. if iszero (g x) then f x else g x) (λx:Nat. pred x) → (Nat→Nat)→(Nat→Nat),

(λg:(Nat→Nat). g (g (g 0))) (λx:Nat. pred x) → Nat

Question **2**

Partially correct

Mark 0.57 out of 1.00

Select well-typed terms of simply typed lambda calculus with booleans and natural numbers.

Select one or more:

- [x] a. λx:Nat.λy:Nat.**if** iszero x **then** iszero y **else** false ✔
- [ ] b. **if** true **then** false **else** true
- [x] c. λg:Nat→(Nat→Bool). **if** g 0 (succ 0) **then** g 0 **else** g (succ 0) ✔
- [ ] d. λx:Nat.**if** iszero x **then** (λy:Nat.iszero y) **else** (λy:Nat.false)
- [x] e. λg:Nat→Bool. **if** g 0 **then** g 0 **else** g (succ 0) ✔
- [ ] f. λg:Nat→Nat. **if** g 0 **then** g (g 0) **else** g (succ (g 0))
- [x] g. λg:Nat→(Nat→Bool). g (**if** g 0 0 **then** 0 **else** succ 0) ✔
- [ ] h. **if** true **then** 0 **else** false
- [x] i. **if** (λx:Nat.iszero x) **then** (λy:Nat.iszero y) **else** (λy:Nat.false) ✖
- [ ] j. pred (succ (pred (succ 0)))
- [x] k. **if** (iszero 0) **then** 0 **else** false ✖

Your answer is partially correct.

You have correctly selected 4.
The correct answers are:
if true **then** false **else** true,

pred (succ (pred (succ 0))),

λx:Nat.λy:Nat.**if** iszero x **then** iszero y **else** false,

λx:Nat.**if** iszero x **then** (λy:Nat.iszero y) **else** (λy:Nat.false),

λg:Nat→Bool. **if** g 0 **then** g 0 **else** g (succ 0),

λg:Nat→(Nat→Bool). **if** g 0 (succ 0) **then** g 0 **else** g (succ 0),

λg:Nat→(Nat→Bool). g (**if** g 0 0 **then** 0 **else** succ 0)

Question **3**

Incorrect

Mark 0.00 out of 1.00

True or False? In simply typed lambda calculus, if a term **t** can evaluate to another term, then there exists some type **T** and some context **Γ**, such that **Γ** ⊢ **t** : **T**.

Select one:

- (●) True ✖
- ( ) False

The correct answer is 'False'.

Question 4

Incorrect

Mark 0.00 out of 1.00

True or False? In simply typed lambda calculus, if **Γ ⊢ t : A** then either **t** is value, or it can be evaluated to another term of type **T**, i.e. there exists term **t'**, such that **t ⟶ t'**, moreover, **Γ ⊢ t' : A.**

Select one:

- True
- False ✖

The correct answer is 'True'.

◄ Quiz 1 — Mar 24 from 9:10 to 9:20 (10 minutes)

Jump to...

Quiz 3 — Mar 31 from 9:10 to 9:20 (10 minutes) ►

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