Started on	Wednesday, 4 May 2022, 10:50 AM
State	Finished
Completed on	Wednesday, 4 May 2022, 10:52 AM
Time taken	2 mins 9 secs
Marks	0.90/2.00
Grade	**4.52** out of 10.00 (**45**%)

Question 1

Partially correct

Mark 0.33 out of 1.00

Select the properties that System F satisfies.

- [ ] a. System F is strongly normalizable. That is, any well-typed term in System F can be evaluated in finite number of steps.
- [x] b. Type inference in System F is decidable. That is, there is an algorithm that can say if a given untyped lambda term has a corresponding well-typed term in System F. ✖
- [ ] c. The untyped term **λx. x x** has a well-typed version in System F.
- [x] d. System F supports rank-1 polymorphic functions, but not rank-2 polymorphic functions. ✖
- [ ] e. Pure System F has no well-typed terms, we have to add at least some base types (e.g. Bool or Nat), for it to have any well-typed terms.
- [x] f. System F is type safe. That is, it satisfies both progress and preservation properties. ✔
- [ ] g. System F does not support type erasure, since type application has to be done at run-time.

Your answer is partially correct.

You have correctly selected 1.

The correct answers are:

System F is strongly normalizable. That is, any well-typed term in System F can be evaluated in finite number of steps.,

System F is type safe. That is, it satisfies both progress and preservation properties.,

The untyped term **λx. x x** has a well-typed version in System F.

Question **2**

Partially correct

Mark 0.57 out of 1.00

Select well-typed terms in System F.

- [x] a. `λx:(∀X.X→X). x [∀X.X→X] x` ✔
- [ ] b. `let id = λX. λx:X. x in id [Nat] 0`
- [x] c. `let twice = λX. λf:X→X. λx:X. f (f x) in twice [Nat] (λn:Nat. succ n) 0` ✔
- [ ] d. `λX. λf:X→X. λx:X. f (f x)`
- [x] e. `λX. λf:X→X. λx:X. f (f x)` ✔
- [ ] f. `λX. λx:X. x`
- [x] g. `let id = λX. λx:X. x in id [Nat]` ✔

Your answer is partially correct.

You have correctly selected 4.

The correct answers are: `λX. λx:X. x`, `let id = λX. λx:X. x in id [Nat]`, `let id = λX. λx:X. x in id [Nat] 0`, `λX. λf:X→X. λx:X. f (f x)`, `λX. λf:X→X. λx:X. f (f x)`, `let twice = λX. λf:X→X. λx:X. f (f x) in twice [Nat] (λn:Nat. succ n) 0`, `λx:(∀X.X→X). x [∀X.X→X] x`

◄ Quiz 11 — Apr 28 from 9:10 to 9:20 (10 minutes)

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Quiz 13 — May 5 from 9:10 to 9:20 (10 minutes) ►