Started on	Thursday, 8 September 2022, 10:52 AM
State	Finished
Completed on	Thursday, 8 September 2022, 11:01 AM
Time taken	8 mins 59 secs
Grade	**4.60** out of 10.00 (**46**%)

Question **1**

Partially correct

Mark 0.60 out of 6.00

Select all **closed** lambda terms among the following

Select one or more:

- a. `λx.x (λy.z (λz.y))` ✖ The first (leftmost) occurrence of z is free.
- b. `(λx.λy.x) x y`
- c. `λx.(λy.x) x y` ✖ Rightmost variable y is free.
- d. `(λx.x) (λy.y) z`
- e. `(λx.x) (λy.y) (λz.z)`
- f. `λx.λy.x (x y)` ✔
- g. `λx.z (λy.y (λz.x))` ✖ The first (leftmost) occurrence of z is free.
- h. `λx.y (λy.x (λz.z))` ✖ The first (leftmost) occurrence of y is free.
- i. `λx.x`
- j. `λx.x (λx.x (λx.x))` ✔

Your answer is partially correct.

You have selected too many options.
Closed lambda term is a term without free variables.

The correct answers are: `λx.x`, `λx.λy.x (x y)`, `(λx.x) (λy.y) (λz.z)`, `λx.x (λx.x (λx.x))`

Question 2

Correct

Mark 2.00 out of 2.00

Select only those reduction strategies which **do not** evaluate sub terms under lambda abstraction.

Select one or more:

- [x] a. call-by-value evaluation ✔
- [ ] b. applicative evaluation
- [ ] c. full beta-reduction
- [ ] d. normal order evaluation
- [ ] e. no such strategy exist (all strategies will always evaluate under lambda abstraction)
- [ ] f. all strategies fit (no possible strategy will evaluate under lambda abstraction)
- [x] g. call-by-name evaluation ✔

Your answer is correct.

The correct answers are:
call-by-name evaluation,

call-by-value evaluation

Question 3

Correct

Mark 2.00 out of 2.00

Lambda terms t1 and t2 are said to be alpha-equivalent if we can get t2 from t1 (and also t1 from t2) by renaming (zero or more) bound variables.

Select one:

- (•) True ✔
- ( ) False

The correct answer is 'True'.