Started on	Thursday, 7 April 2022, 9:10 AM
State	Finished
Completed on	Thursday, 7 April 2022, 9:14 AM
Time taken	4 mins 8 secs
Marks	2.00/3.00
Grade	**6.67** out of 10.00 (**67**%)

Question **1**

Correct

Mark 1.00 out of 1.00

Which of the following simply typed lambda terms grow in size after **one** computation step. Size of terms is defined as follows:

```
size(x)    := 1
size(λx.t) := 1 + size(t)
size(t u)  := 1 + size(t) + size(u)
```

Select one or more:

☐ a. $(\lambda x{:}A{\to}A.x)(\lambda y{:}A.y)$

☑ b. $(\lambda f{:}A{\to}A.\lambda x{:}A.f(f(f(f(x)))))(\lambda y{:}A.y)$ ✔

☑ c. $(\lambda x{:}A{\to}A.\lambda f{:}(A{\to}A){\to}(A{\to}A){\to}(A{\to}A){\to}A.f\ x\ x\ x)(\lambda y{:}A.y)$ ✔

☐ d. $(\lambda x{:}A{\to}A.\lambda f{:}(A{\to}A){\to}A.f\ x)(\lambda y{:}A.y)$

Your answer is correct.

The correct answers are: $(\lambda x{:}A{\to}A.\lambda f{:}(A{\to}A){\to}(A{\to}A){\to}(A{\to}A){\to}A.f\ x\ x\ x)(\lambda y{:}A.y)$, $(\lambda f{:}A{\to}A.\lambda x{:}A.f(f(f(f(x)))))$ $(\lambda y{:}A.y)$

Question **2**

Incorrect

Mark 0.00 out of 1.00

True or False? Simply typed lambda calculus without any extensions (including base types), and only function types, is strongly normalizable — any term in such calculus is strongly normalizable.

Select one:

○ True

● False ✖

The correct answer is 'True'.

Question 3

Correct

Mark 1.00 out of 1.00

In simply typed lambda calculus with booleans and tuples, any well-typed term is either a value, or can be reduced in finite number of steps to a value.

Select one:

◉ True ✔

◯ False

The correct answer is 'True'.

◄ Quiz 4 — Apr 6 from 10:50 to 11:00 (10 minutes)

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Quiz 6 — Apr 13 from 10:50 to 11:00 (10 minutes) ►