INSTRUCTIONS

- You have 15 minutes to complete this quiz.

- The exam is closed book, closed notes, closed computer, closed calculator.

- The final score for this quiz will be assigned based on **effort** rather than correctness.

- Mark your answers **on the exam itself**. We will *not* grade answers written on scratch paper.

- For multiple choice questions,
    - ☐ means mark **all options** that apply
    - ◯ means mark a **single choice**

Last name	
First name	
Student ID number	
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Teaching Assistant	◯ Alex Stennet ◯ Kelly Chen ◯ Angela Kwon ◯ Michael Gibbes ◯ Ashley Chien ◯ Michelle Hwang ◯ Joyce Luong ◯ Mitas Ray ◯ Karthik Bharathala ◯ Rocky Duan ◯ Kavi Gupta ◯ Samantha Wong
Name of the person to your left	
Name of the person to your right	
All the work on this exam is my own. **(please sign)**	

1. (1 points) Catching Some Zzz's

Assume that you have started `python3` and executed the following expression. What would Python display?

`(lambda z: z())((lambda z: z)(lambda: lambda: 'Zzz'))`

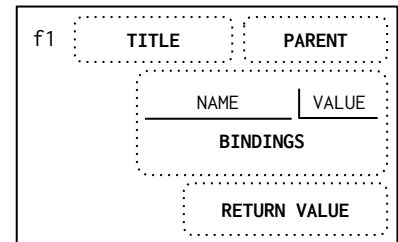◯ 'Zzz' ◯ z ◯ z() ◯ z: z ◯ z: z() ◯ Function ◯ Error ◯ Other

2. (5 points) Inside Out

(a) On the next page, fill in the environment diagram that results from executing the code below until the entire program is finished, an error occurs, or all frames are filled.

You may not need to use all of the spaces or frames.

(b) Then, for each region below, fill in the corresponding bubble. Leave a row blank if the space in the environment diagram should be left blank.

To receive credit, you must list your bindings in the order in which they are first bound in the frame.

```
f1   TITLE         PARENT

           NAME  | VALUE
           BINDINGS

       RETURN VALUE
```

Frame	Field	Names	Values
Global	Binding 1	inside	`func inside(out) [parent=Global]`
	Binding 2	fear	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
	Binding 3	disgust	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
f1	Title	inside	
	Binding 1	out	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
	Binding 2	◯ anger ◯ disgust ◯ fear	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
	Binding 3	◯ anger ◯ disgust ◯ fear	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
	Binding 4	◯ anger ◯ disgust ◯ fear	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
	Return		◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ None
f2	Title	λ < line ◯ 2 ◯ 3 ◯ 8 >	
	Binding 1	◯ anger ◯ disgust ◯ fear	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
	Return		◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ None
f3	Title	λ < line ◯ 2 ◯ 3 ◯ 8 >	
	Binding 1	◯ anger ◯ disgust ◯ fear	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
	Return		◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ None
f4	Title	λ < line ◯ 2 ◯ 3 ◯ 8 >	
	Binding 1	◯ anger ◯ disgust ◯ fear	◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ α ◯ β ◯ γ
	Return		◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ None

DO NOT TURN IN THIS PAGE.

Remember to fill out the choices on the previous page to receive credit for this quiz.

A complete answer will:

- Add all missing names and parent annotations to all local frames.
- Add all missing values created or referenced during execution.
- Show the return value for each local frame.

```
1  def inside(out):
2      anger = lambda fear: fear(disgust)
3      fear = lambda disgust: anger(out)
4      disgust = 3
5      fear(5)
6
7  fear, disgust = 2, 4
8  inside(lambda fear: fear + disgust)
```

Global frame

inside |_____ ⟶ func inside(out) [parent=Global]

fear |_____

disgust |_____

f1: inside [parent=Global]

_____ |_____

_____ |_____

_____ |_____

_____ |_____

Return Value |_____

α func λ(fear) <line 2> [parent=_____]

β func λ(disgust) <line 3> [parent=_____]

γ func λ(fear) <line 8> [parent=_____]

f2: _____ [parent=_____]

_____ |_____

Return Value |_____

f3: _____ [parent=_____]

_____ |_____

Return Value |_____

f4: _____ [parent=_____]

_____ |_____

Return Value |_____

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