INSTRUCTIONS

- You have 10 minutes to complete this quiz.
- The exam is closed book, closed notes, closed computer, closed calculator.
- Mark your answers on the exam itself. We will not grade answers written on scratch paper.
- For multiple choice questions, fill in each option or choice completely.
  - □ means mark all options that apply
  - ○ means mark a single choice

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All the work on this exam is my own. (please sign)

0. Your thoughts? How has your week been?
1. Temporal Locality

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.

A complete answer will:

- Add all missing names and parent annotations to frames.
- Add all missing values created or referenced during execution.
- Show the return value for each local frame.
- Use box-and-pointer notation for lists. You don’t need to write index numbers or the word “list”.

```python
def cache(f):
    hits = 0
    cache = [hits]
    def run(x):
        nonlocal hits, cache
        def hits(hits):
            if hits:
                cache = []
            else:
                cache = [not hits]
        return cache
        y = f(x)
        hits(hits).append([x, y])
        return x or y
    return run

func cache(f) [parent=Global]

func run(x) [parent= ]

func hits(hits) [parent= ]

func lambda(x) [parent= ]
```

```python
def cache(f):
    hits = 0
    cache = [hits]
    def run(x):
        nonlocal hits, cache
        def hits(hits):
            if hits:
                cache = []
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                cache = [not hits]
        return cache
        y = f(x)
        hits(hits).append([x, y])
        return x or y
    return run

cache(lambda x: cache)(1)
```