CS 61A Discussion 10

Streams (and Interpreters)

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Slides: albertxu.xyz/teaching/cs61a/

*part of these slides sourced from Jemmy and I's Final Review Fall '18

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- A promise stored in the rest is not evaluated until we call cdr-stream on the stream.

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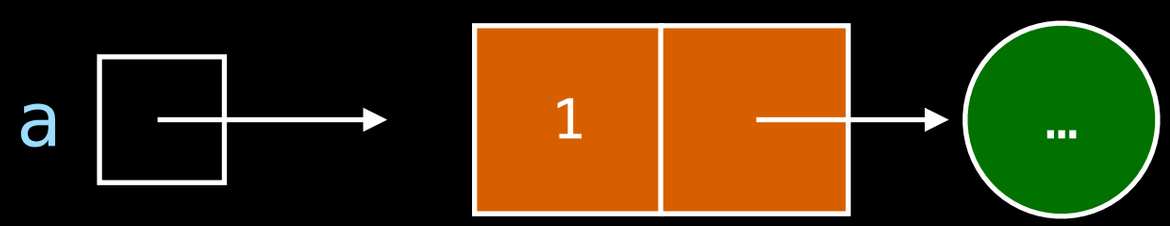

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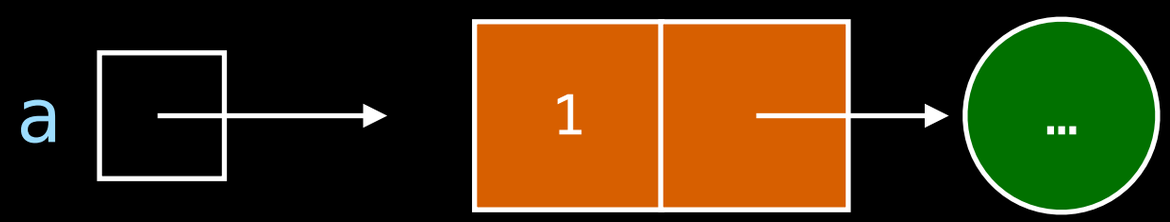

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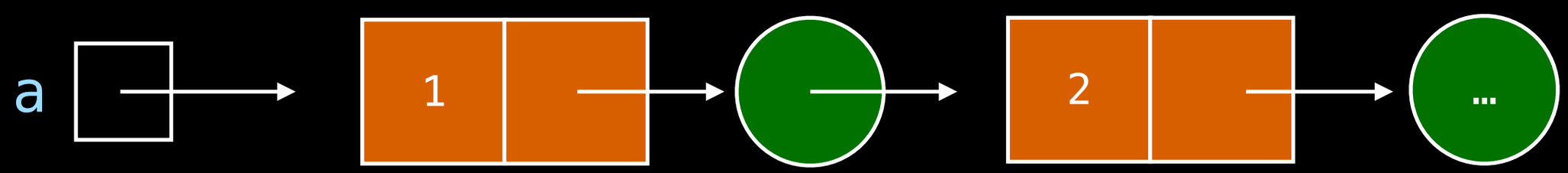


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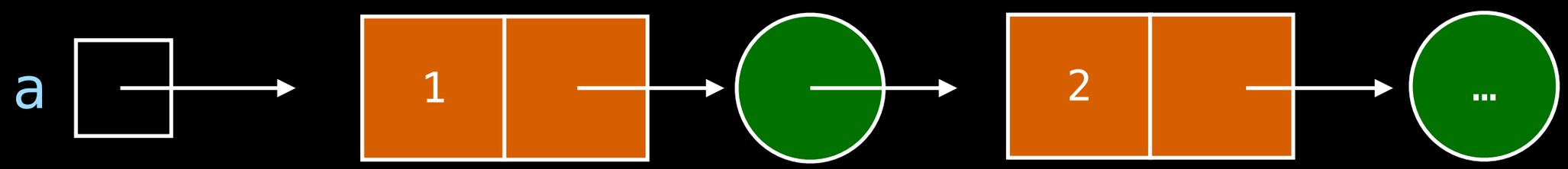


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Takeaway: notice how calling cdr-stream on a stream actually mutates that stream!

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- So why doesn’t Python have streams?

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- Streams can represent infinite sequences!

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            >>> (cdr-stream (naturals 1))
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```

- So why doesn't Python have streams?
    - Because generators can represent infinite sequences too!

Questions

1. How does a stream differ from a list in Scheme?

2. What arguments does `cons-stream` take in, and how does it differ from `cons`?

3. What's so special about `cdr-stream` - what's the difference between it and `cdr`?

Review Questions

1. How does a stream differ from a list in Scheme?

   The rest of a stream is only computed when we first access it, xa in a Scheme linked list we compute all the elements when it's created. This allows us to create infinite streams!

2. What arguments does `cons-stream` take in, and how does it differ from `cons`?

   Just like `cons`, `cons-stream` takes in a 1) a first element and 2) a rest which is another stream or nil, but instead of evaluating the second operand, it stores it as data in the promise!

Review Questions

3. What's so special about `cdr-stream` - what's the difference between it and `cdr`?

   On the first call to `cdr-stream` on that stream, the expression that was unevaluated and stored upon construction is now evaluated to return the rest of the stream. This **value is stored** so that on subsequent calls to `cdr-stream`, the rest no longer needs to be computed.

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On the first call to `cdr-stream` on that stream, the expression that was unevaluated and stored upon construction is now evaluated to return the rest of the stream. This **value is stored** so that on subsequent calls to `cdr-stream`, the rest no longer needs to be computed.

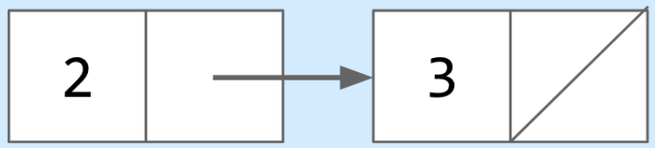
Takeaway: each element in the stream is only computed once, and anytime in the future we look up that element we use that stored value

Lists

```
scm> (define a (cons 1 (cons 2
(cons 3 nil))))
```


```
scm> (car a)
1

scm> (cdr a)
```



Streams

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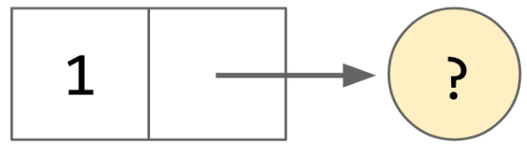


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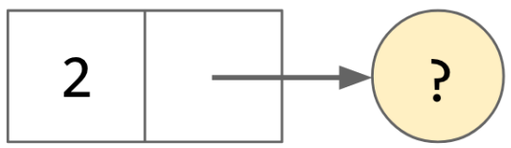

Thanks for coming.

Have a great rest of your week! :)

Attendance: links.cs61a.org/albert-disc
Slides: albertxu.xyz/teaching/cs61a/