SICP

God's Programming Book

Lecture-20 Decomposition

Decomposition

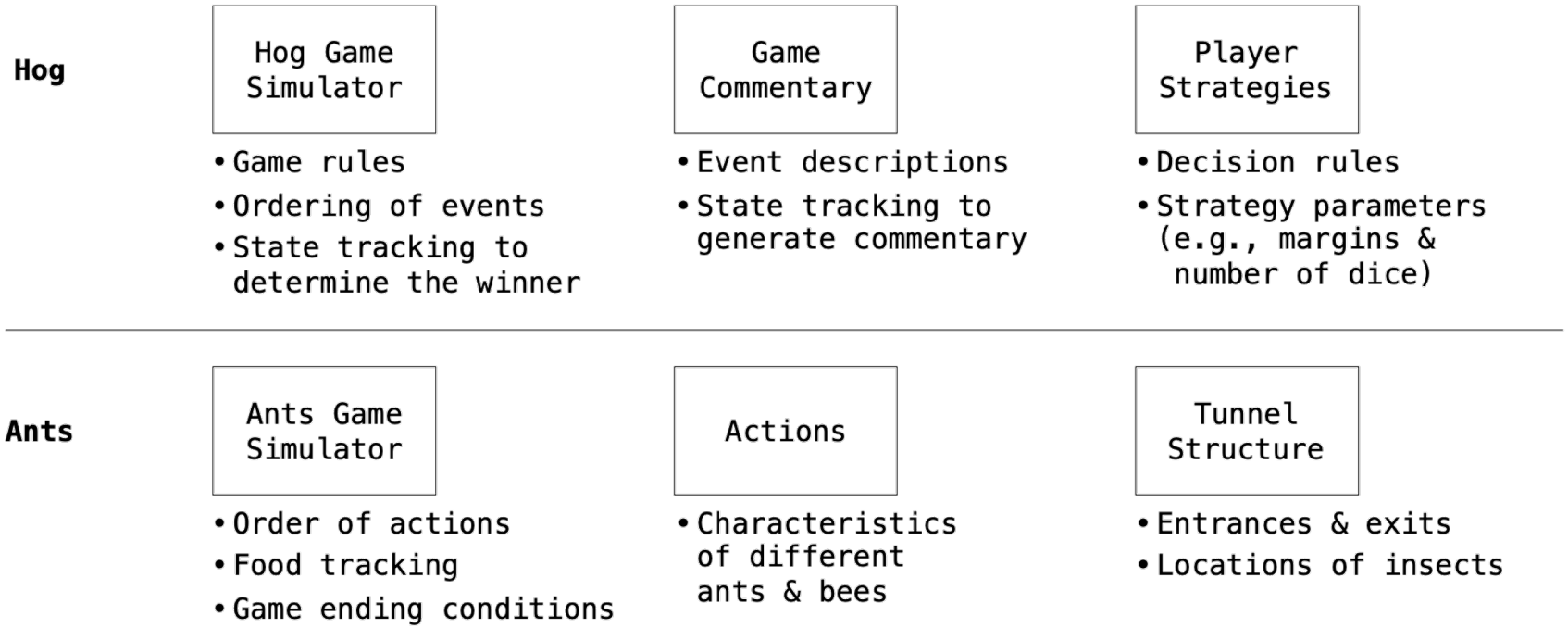
Slides Adapted from cs61a of UC Berkeley

Modular Design

Separation of Concerns

A design principle: Isolate different parts of a program that address different concerns

A modular component can be developed and tested independently



Set Intersection

Linear-Time Intersection of Sorted Lists

Given two sorted lists with no repeats, return the number of elements that appear in both.


```
def fast_overlap(s, t):
    """Return the overlap between sorted S and sorted T.

    >>> fast_overlap([3, 4, 6, 7, 9, 10], [1, 3, 5, 7, 8])
    2
    """
    i, j, count = 0, 0, 0

    while _____________________________________________:
        if s[i] == t[j]:
            count, i, j = _____________________________
        elif s[i] < t[j]:
            _____________________________________________
        else:
            _____________________________________________
    return count
```

Linear-Time Intersection of Sorted Lists

Given two sorted lists with no repeats, return the number of elements that appear in both.


```
def fast_overlap(s, t):
    """Return the overlap between sorted S and sorted T.

    >>> fast_overlap([3, 4, 6, 7, 9, 10], [1, 3, 5, 7, 8])
    2
    """
    i, j, count = 0, 0, 0

    while          i < len(s) and j < len(t)          :
        if s[i] == t[j]:
            count, i, j =  count + 1, i + 1, j + 1
        elif s[i] < t[j]:
                           i = i + 1
        else:
                           j = j + 1
    return count
```

Sets

Sets

One more built-in Python container type

- Set literals are enclosed in braces
- Duplicate elements are removed on construction
- Sets have arbitrary order

```
>>> s = {'one', 'two', 'three', 'four', 'four'}
>>> s
{'three', 'one', 'four', 'two'}
>>> 'three' in s
True
>>> len(s)
4
>>> s.union({'one', 'five'})
{'three', 'five', 'one', 'four', 'two'}
>>> s.intersection({'six', 'five', 'four', 'three'})
{'three', 'four'}
>>> s
{'three', 'one', 'four', 'two'}
```

Thanks for Listening