[320] Dense Graphs: Language Detection Example

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Review: Stacks, Queues, Priority Queues

1

```
while len(todo):
    curr = todo.pop(0)

    # other code...
    # appends to todo
```

2

```
while len(todo):
    todo.sort()
    curr = todo.pop(0)

    # other code...
    # appends to todo
```

3

```
while len(todo):
    curr = todo.pop(-1)

    # other code...
    # appends to todo
```

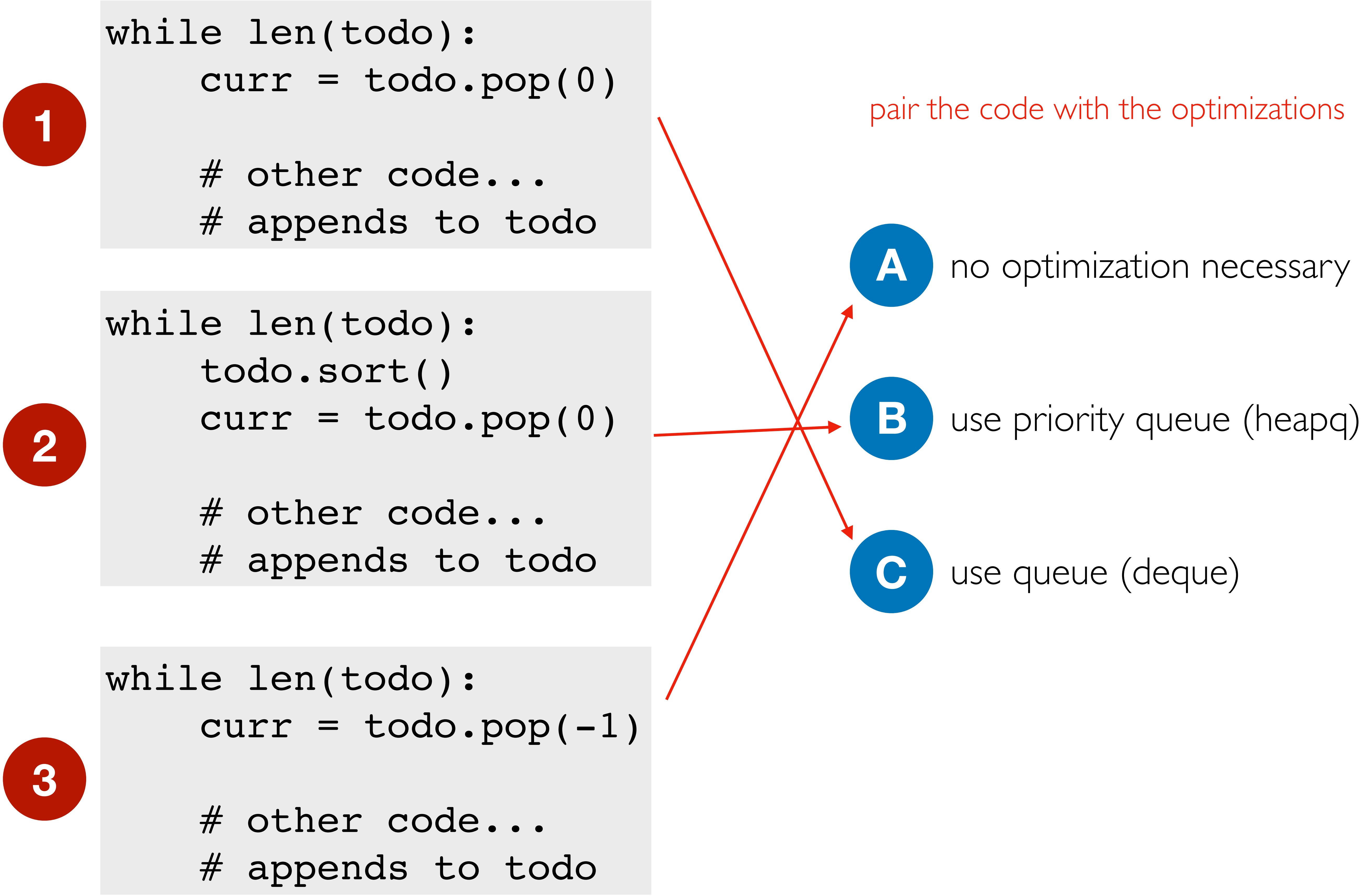
pair the code with the optimizations

A no optimization necessary

B use priority queue (heapq)

C use queue (deque)

Review: Stacks, Queues, Priority Queues



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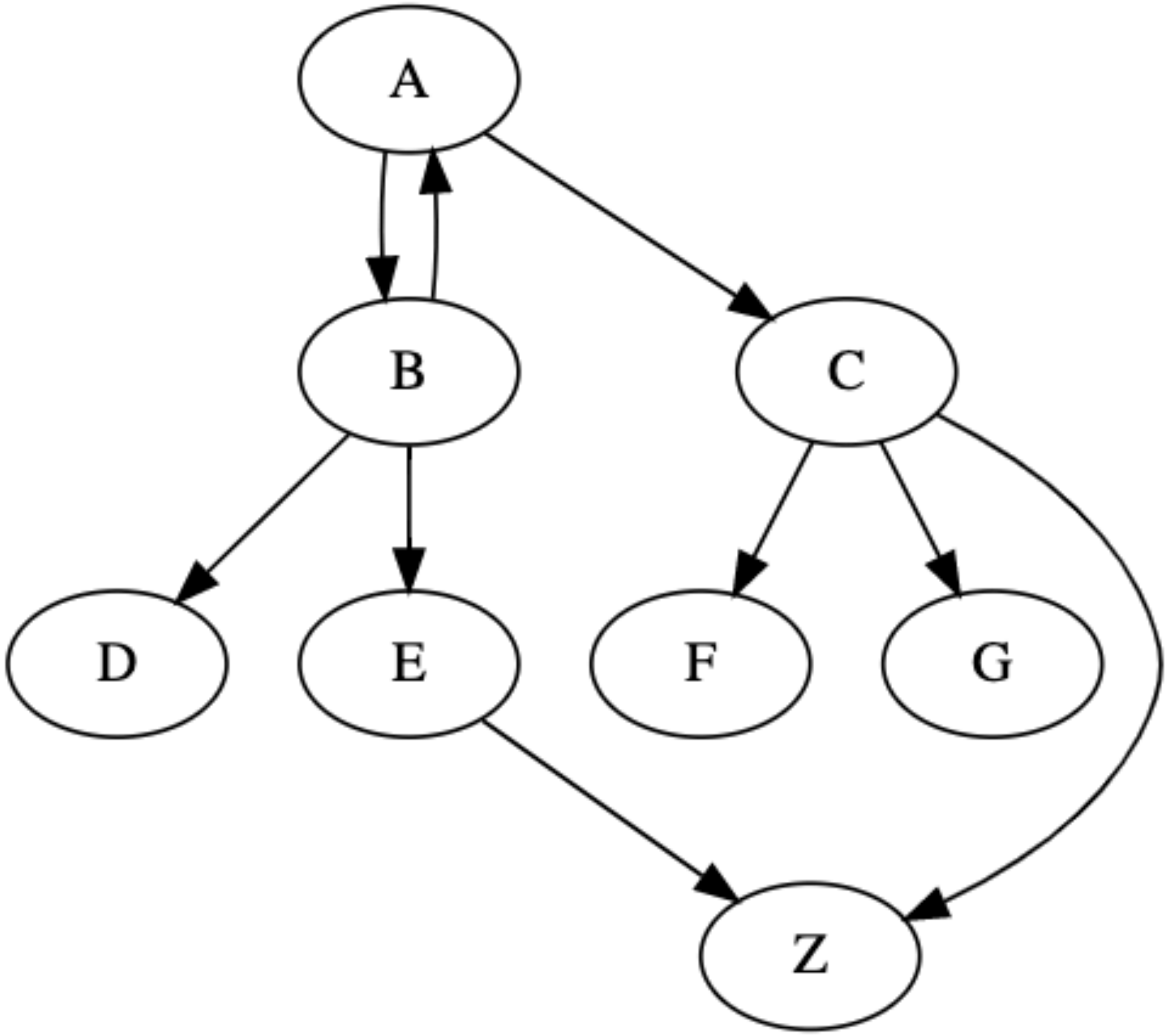
Review: Search Order



Assume any loop over a node's edges goes left to right.

We want to find an A-to-Z path.

With DFS:

- what path is found?
- what is the traversal order?

With BFS:

- what path is found?
- what is the traversal order?

which one is BFS?

B

```
def find(self, dst):
    if self.name in self.graph.visited:
        return None
    self.graph.visited.add(self.name)

    if self.name == dst:
        return (self.name,)

    for child in self.children:
        childpath = child.find(dst)
        if childpath != None:
            return (self.name, ) + childpath
    return None
```

A

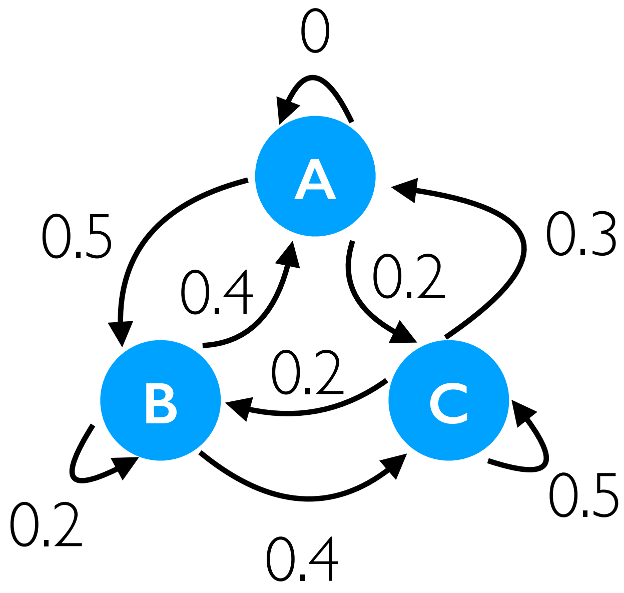
```
def find(self, dst):
    self.prev = None
    todo = [self]

    while len(todo):
        node = todo.pop(0)

        if node.name == dst:
            return node.backtrace()

        for child in node.children:
            if child.name in added:
                continue
            child.prev = self
            todo.append(child)
            added.add(child.name)

    return None
```

Draw graphs that:

- work fine with the BFS code
- reveal the bug in the BFS code

Today: Language Detection

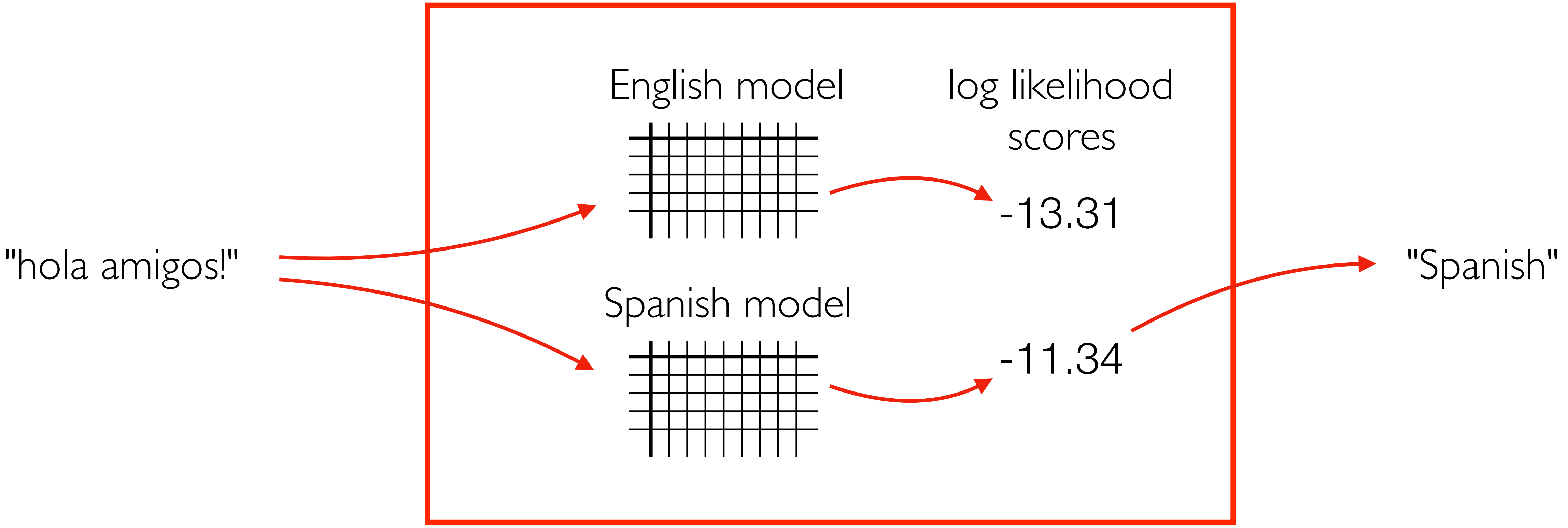
Markov chain



Dense graph representation

	A	B	C
A	0	0.5	0.5
B	0.4	0.2	0.4
C	0.3	0.2	0.5

Classifier



"hola amigos!"

English model

log likelihood scores

-13.31

Spanish model

-11.34

"Spanish"