Prefix Trees

A prefix tree (or just "trie") indexes words by prefix
lookup: follow a path from the root using a prefix, then enumerate everything below the resulting node
Example: "JO"
add: follow a path from the root using a word, adding branches for each new letter until the end is reached
Example: "JANET"

The Flask Web Framework

Translates HTTP requests (described in a future lecture) to Python function calls
Manages data exchange between a browser and a Python program

Threads

A thread executes a function call
Multiple threads can execute different calls simultaneously
For high-latency operations such as web requests, threading can increase speed enormously
Thread(target=<function>, args=<args>): Create (but do not start) a thread of execution
.start(): Start the function call, but do not wait for it to complete
.join(): Wait for the function call to complete (return value is ignored)
.run(): Start the function call and wait for it to complete
Shared State and Race Conditions

When multiple threads make changes to the same object, the result can be unpredictable:

```
x = 10
do_something()
y = x
do_something()
x = y * 2
do_something()
x = z + 1
```

Locks and Critical Sections

A critical section is a sequence of statements that should be executed atomically:

```
x = 10
s = Lock()
do_something()
s.acquire()
y = x
do_something()
x = y * 2
s.release()
do_something()
s.acquire()
z = x
do_something()
x = z + 1
s.release()
```