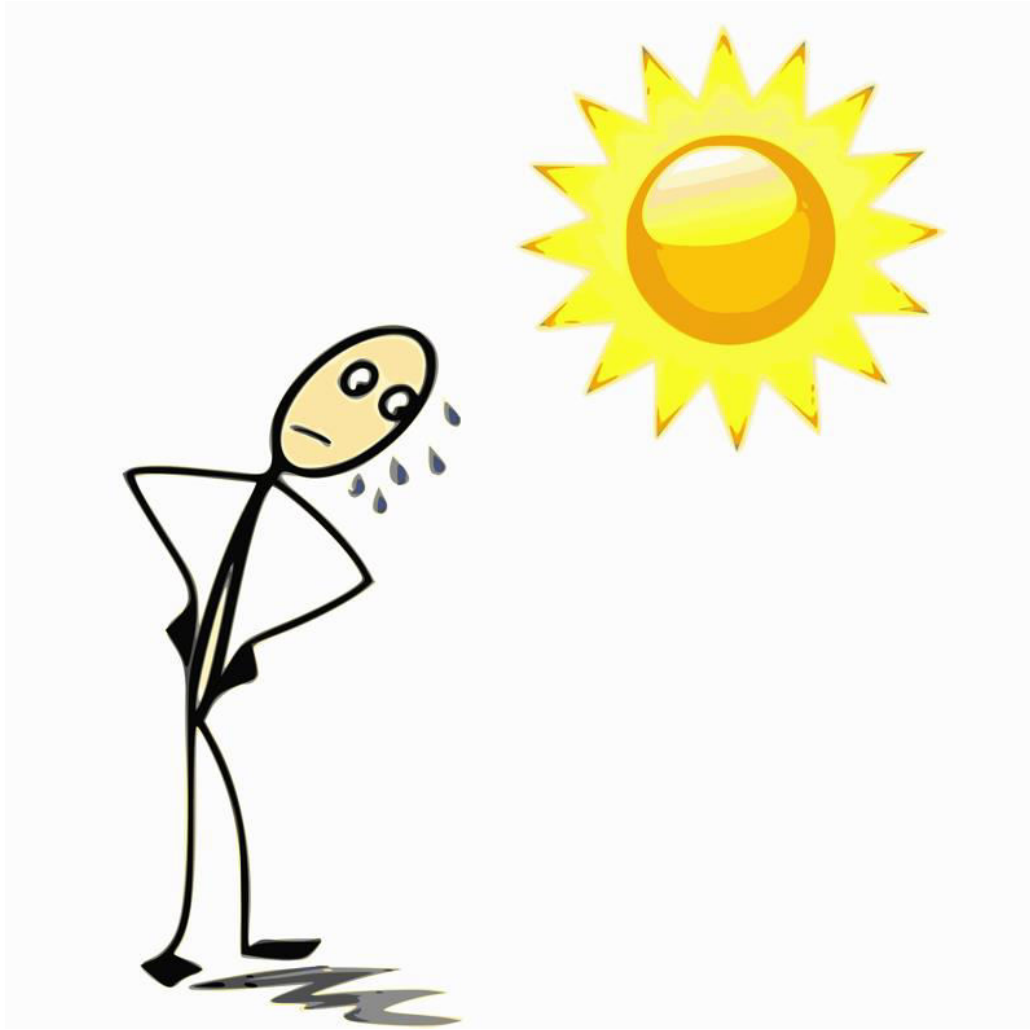
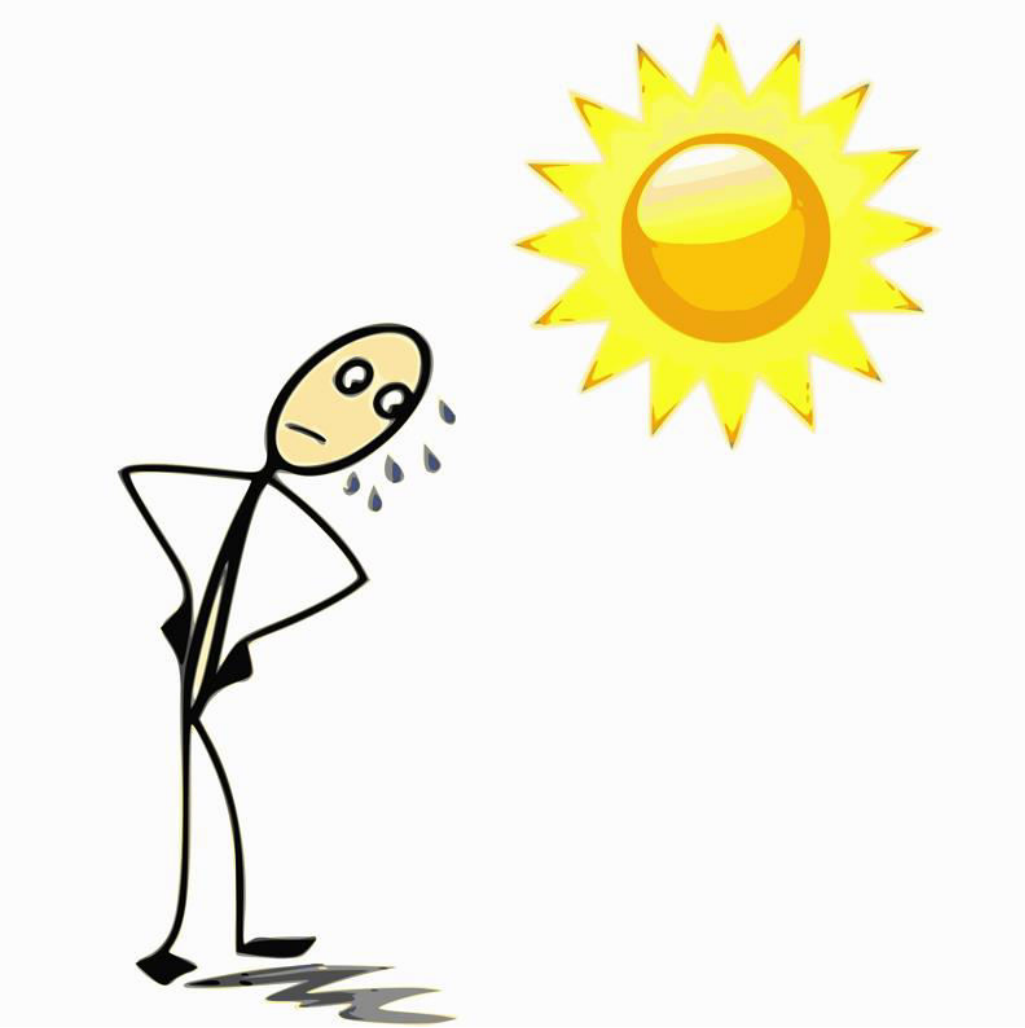
Algorithm performance

Asymptotic analysis

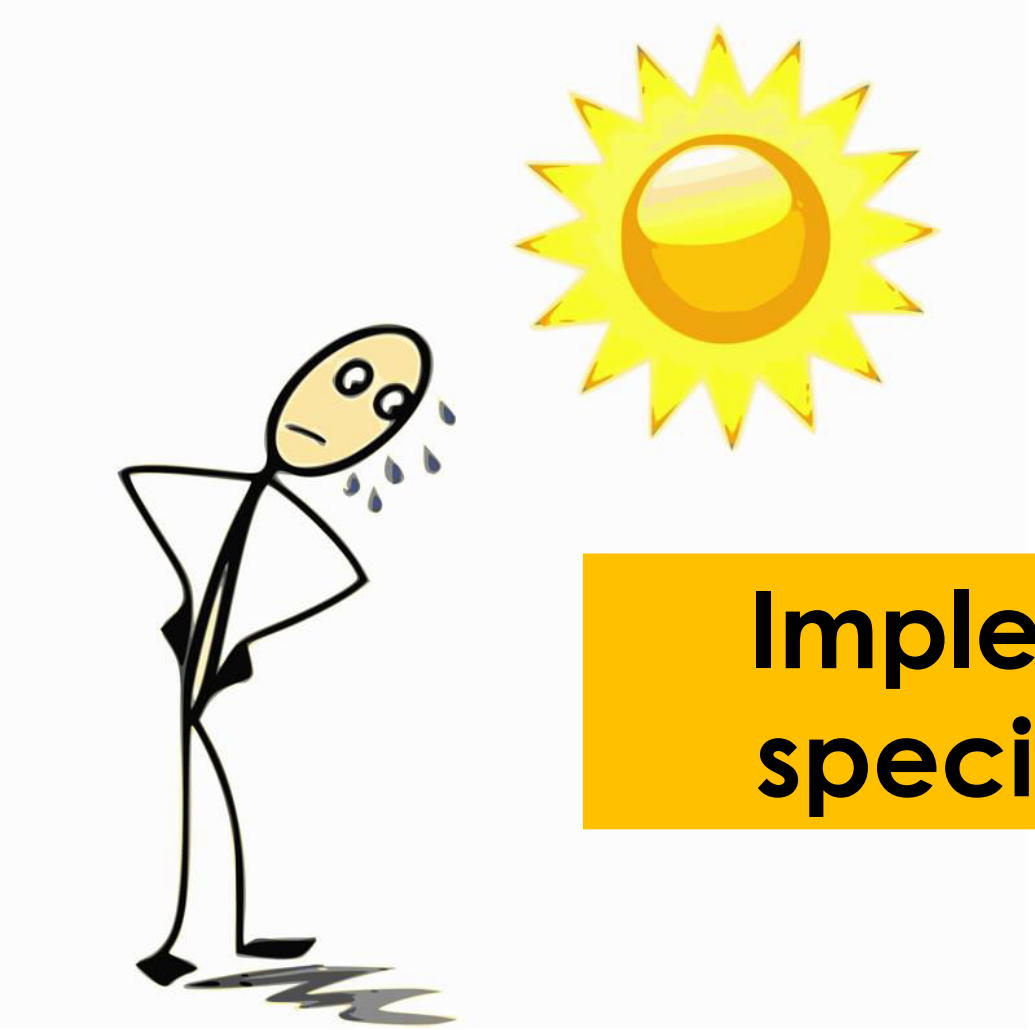
By the end of this video you will be able to…

- Explain why asymptotic analysis is useful
- Calculate the big-O class of a code snippet





Initialization time



Initialization time

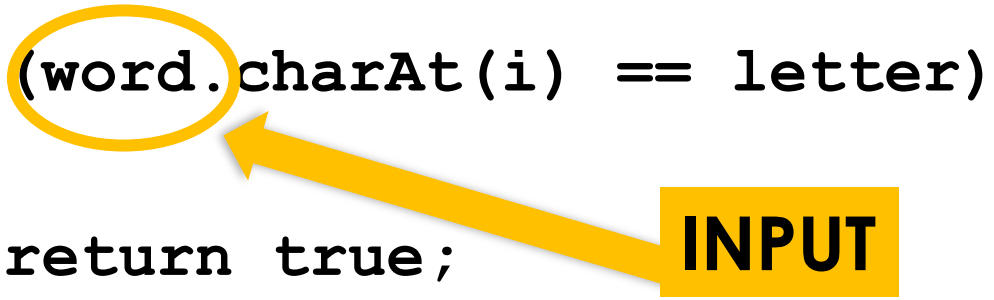
Implementations of specific operations

Focus on how performance scales

If input is **twice** as big,
how many **more operations** do we need?

```
if (word.charAt(i) == letter)
{
    return true;
}
```

```
if (word.charAt(i) == letter)
{
    return true;
}
```



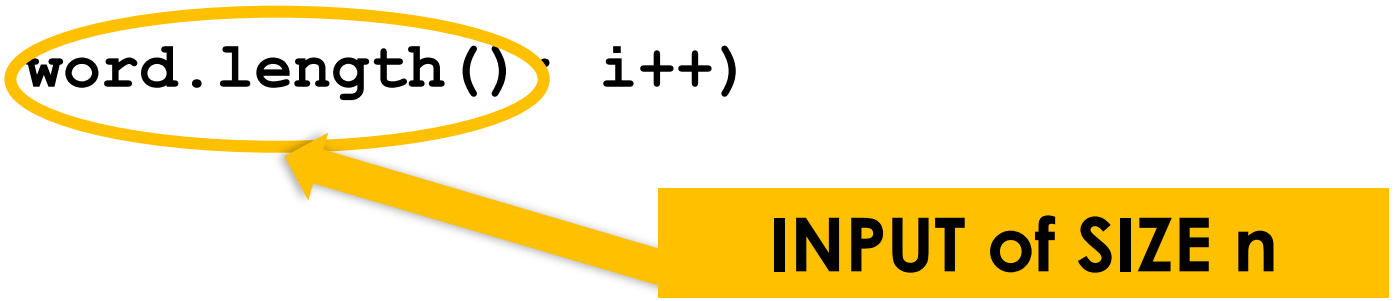
```
if (word.charAt(i) == letter)
{
    return true;
}
```

```
if (word.charAt(i) == letter)
{
    return true;
}
```

Constant time

```
int count = 0;
for (int i = 0; i < word.length(); i++)
{
    count ++;
}
```

```
int count = 0;
for (int i = 0; i < word.length(); i++)
{
    count ++;
}
```



```
int count = 0;
for (int i = 0; i < word.length(); i++)
{
    count ++;
}
```

1

```
int count = 0;
for (int i = 0; i < word.length(); i++)
{
    count ++;
}
```

1 1 1

n times

```
int count = 0;
for (int i = 0; i < word.length(); i++)
{
    count ++;
}
```

1 1 n times

1

1 + (1+3n+1)

count i n

```
int count = 0;
for (int i = 0; i < word.length(); i++)
{
    count ++;
}
```

1 1 n times

1

3n + 3

```
int count = 0;
for (int i = 0; i < word.length(); i++)
{
    count ++;
}
```

Linear time

$f(n) = O(g(n))$

means

Eventually,

f(n) and g(n) grow in same way as their input grows

up to constants