

CS61A

Exam Prep 1

We will start at Berkeley time!

Fall 2020
Midterm 1
Q1a

(5 min)

```
def count(element, box):  
    """Count how many times digit element appears in integer box.
```

```
>>> count(2, 222122)
```

```
5
```

```
>>> count(0, -2020)
```

```
2
```

```
>>> count(0, 0) # 0 has no digits
```

```
0
```

```
"""
```

```
assert element >= 0 and element < 10
```

```
    box = abs(box)
```

```
    (a)
```

```
    total = 0
```

```
    while box > 0:
```

```
        if box % 10 == element
```

```
            (b)
```

```
            total = total + 1
```

```
            (c)
```

```
        box = box // 10
```

```
    return total
```

$n \% 10$

$n // 10$

$box \% 10$

↓
right digit

$-123 \% 10$

→ 7

-3

Fall 2020 Midterm 1 Q1b

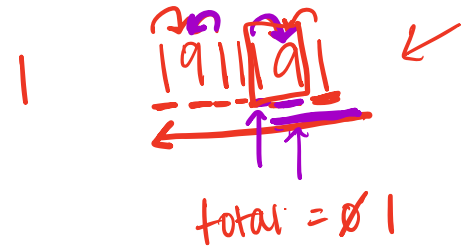
(7 min)

$n \% 10$
 $n // 10$

$y, x = x, y$

```
def count_nine(element, box):
    """Count how many times digit element appears in the non-negative integer
    box in a place that is not next to a 9.
```

```
>>> count_nine(2, 222122)
5
>>> count_nine(1, 1911191) # Only the middle 1 is not next to a 9
1
>>> count_nine(9, 9)
1
>>> count_nine(9, 99)
0
>>> count_nine(3, 314159265359)
2
>>> count_nine(5, 314159265359)
1
>>> count_nine(9, 314159265359)
2
>>> count_nine(0, 0) # No digits are in 0
0
"""
assert element >= 0 and element < 10
assert box >= 0
```



$n = \boxed{1} \boxed{2} 3$

$n \% 10$
 $(n // 10) \% 10$

```
nine, total = False, 0
while box > 0:
    if box % 10 == element and not (nine or (box // 10) % 10 == 9):
        total = total + 1
    nine = box % 10 == 9
    box = box // 10
return total
```

$box \% 100$
 $(box // 10) // 10 \% 10$

Fall 2020
Midterm 1
Q1c

```
def fit(pegs, holes):  
    """Return whether every digit in pegs appears at least as many times in  
    holes as it does in pegs.  
    """  
    >>> fit(123, 321) # Each digit appears once in pegs and in holes.  
    True  
    >>> fit(1213, 33221) # 1 appears twice in pegs, but only once in holes.  
    False  
    >>> fit(12, 22) # 1 appears once in pegs, but not at all in holes.  
    False  
    >>> fit(314159, 112233456789)  
    True  
    """  
    i = 0
```

count(element, box)

(10 min)

```
    while i <= 9:  
        if count(i, pegs) > count(i, holes):  
            return False  
        i = i + 1  
    return True
```

Diagram annotations:

- Red arrow points to the `while` loop.
- Red arrow points to the `9` in the `while` condition.
- Red arrow points to the `count(i, pegs)` expression.
- Red arrow points to the `count(i, holes)` expression.
- Red arrow points to the `return False` statement.
- Red arrow points to the `return True` statement.
- Red bracket on the right side of the `if` statement is labeled "false condition".

Fall 2021 Midterm 1 Q1

(10 min)

Assume the following code has been executed.

```
def os(ki):  
    t = -1  
  
i = 5  
t = 7  
while i > 3:  
    t = i - 4 and i + 4  
    os(i - 2)  
    i, j = i - 1, i * 2  
    s = i
```

i. (1.0 pt) What value is bound to **i** in the global frame?

ii. (1.0 pt) What value is bound to **j** in the global frame?

iii. (1.0 pt) What value is bound to **s** in the global frame?

iv. (1.0 pt) What value is bound to **t** in the global frame?