While Loops

First, Review

Conditionals:

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    <do something else>
<continue program>
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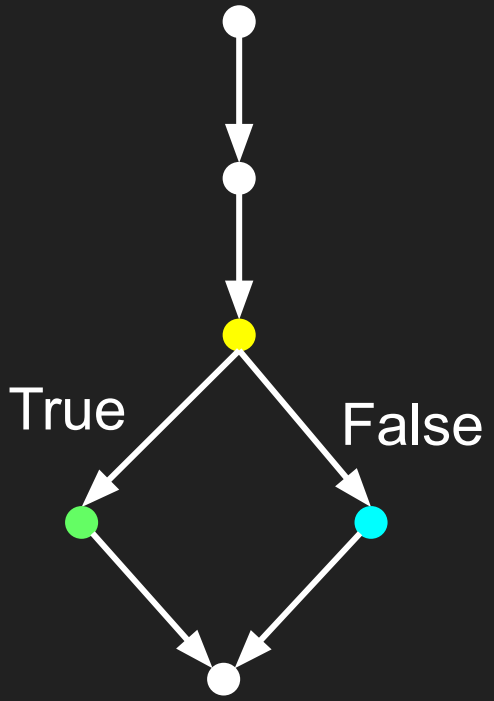

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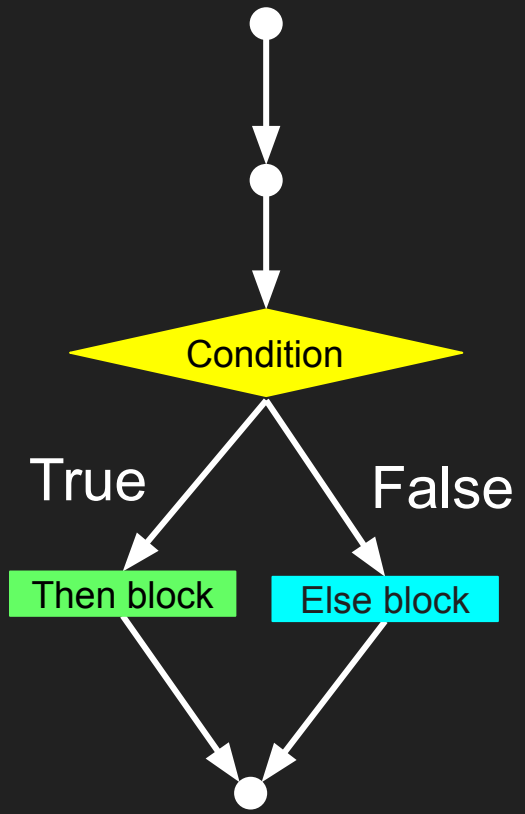

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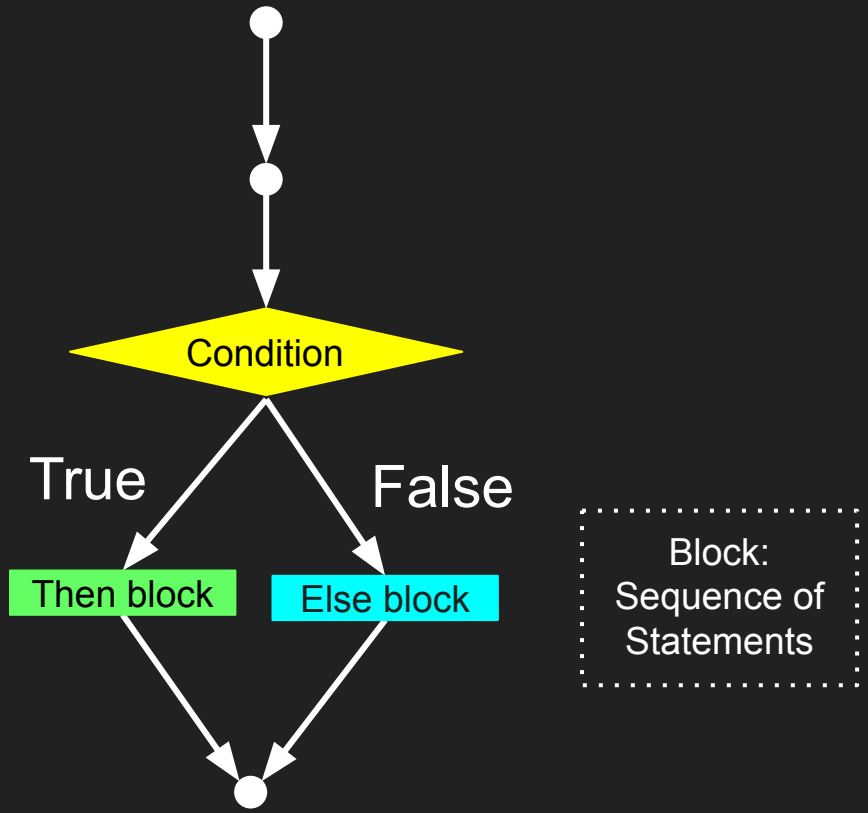
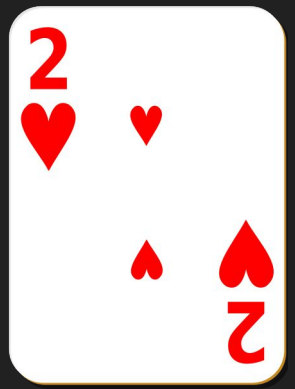
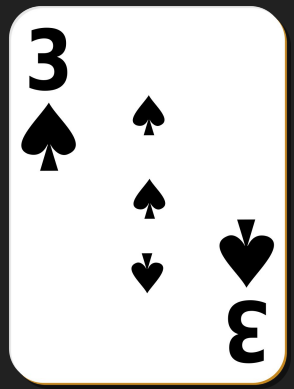
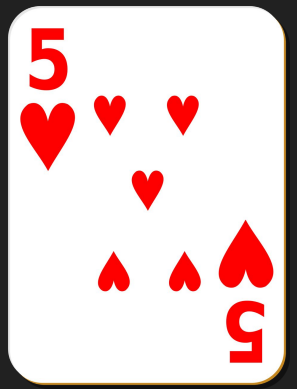


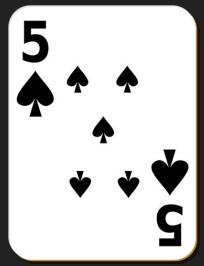
Finding the Lowest Card







Low card:



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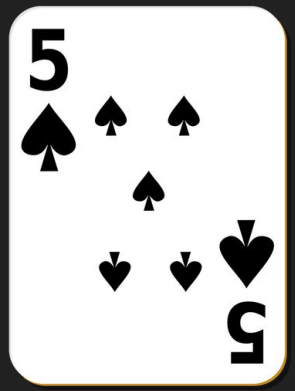
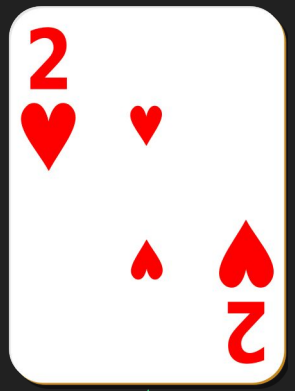
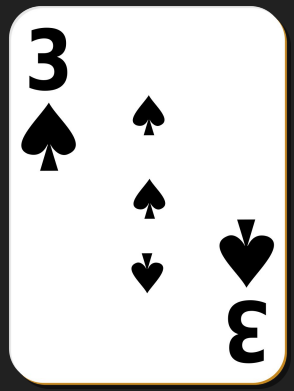
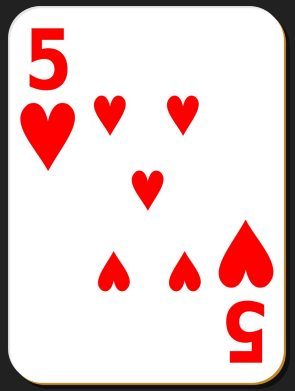


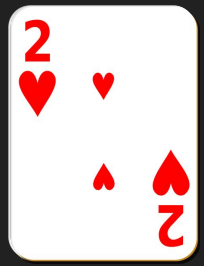






2 < 5? ✓

Low card:



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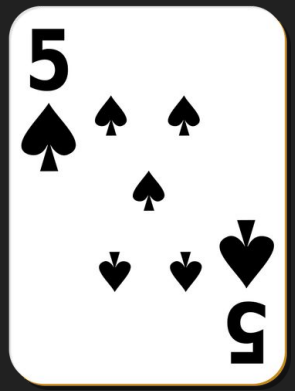
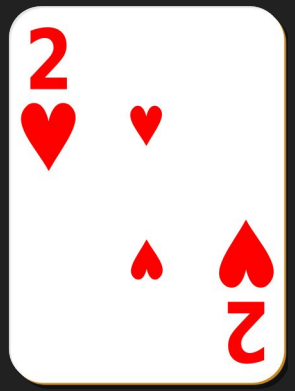
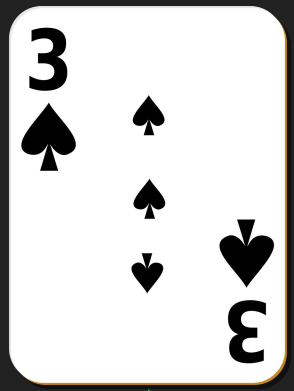
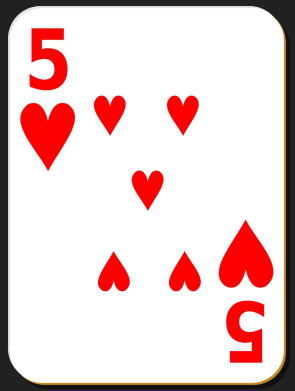


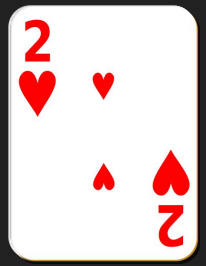






3 < 2?

Low card:



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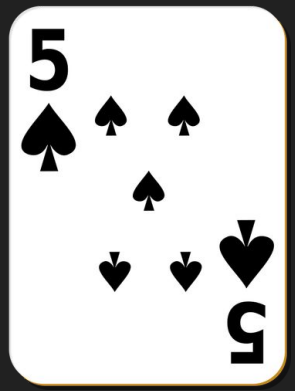
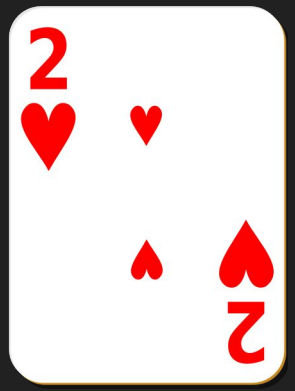
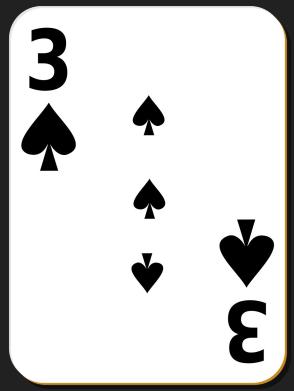
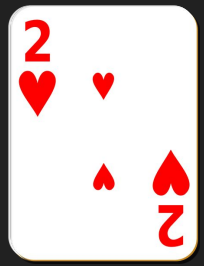






5 < 2? ✗

Low card:



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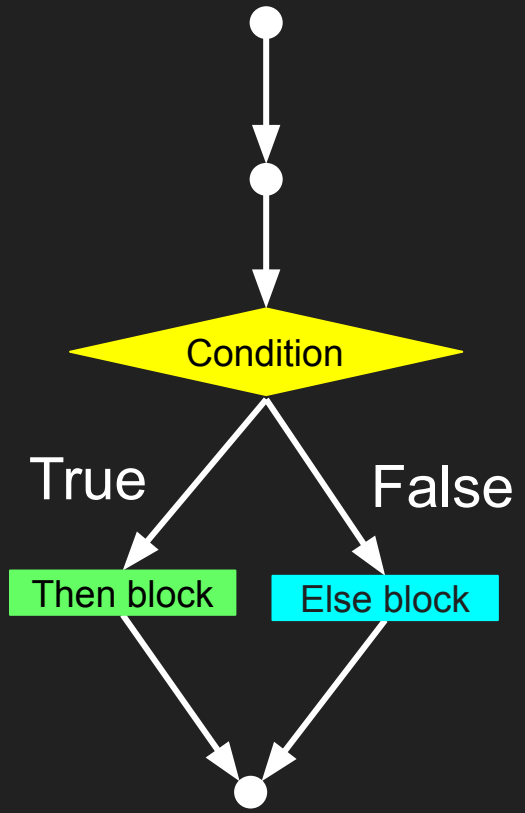

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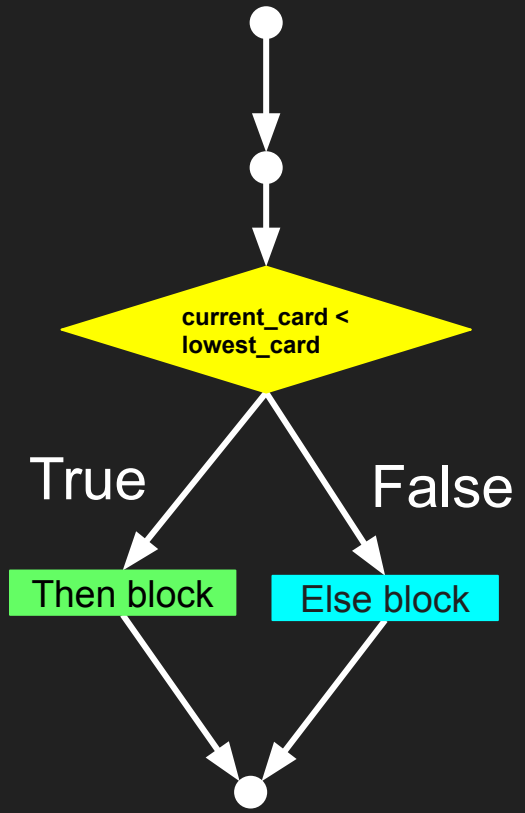

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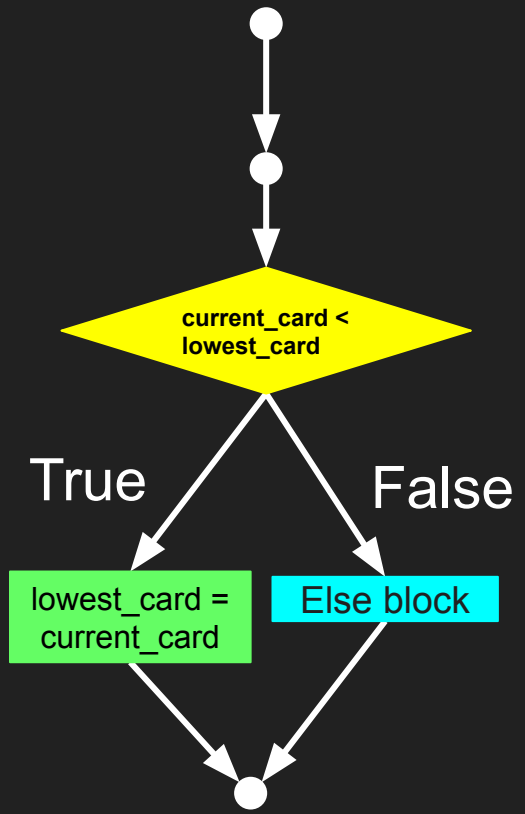

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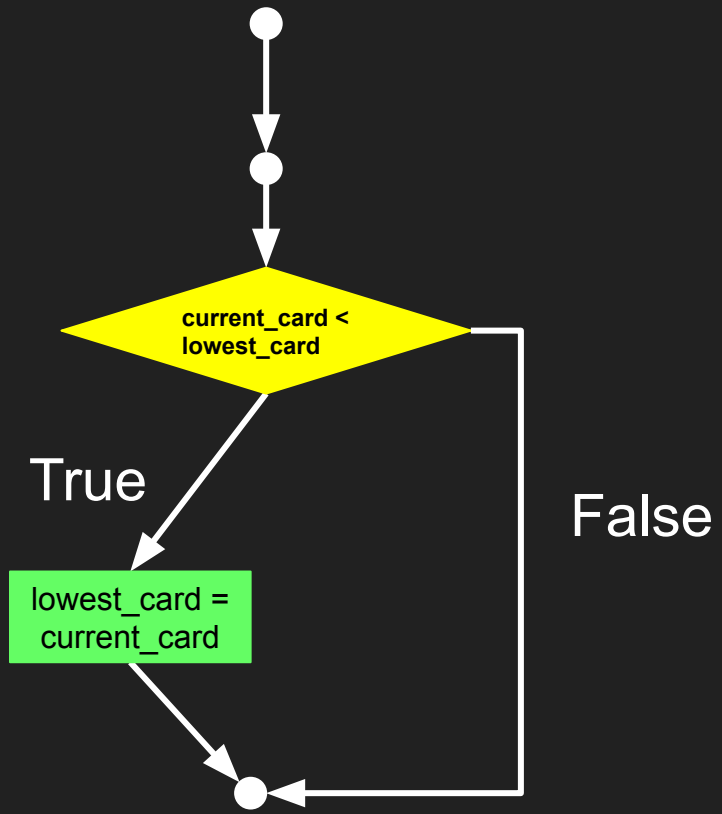

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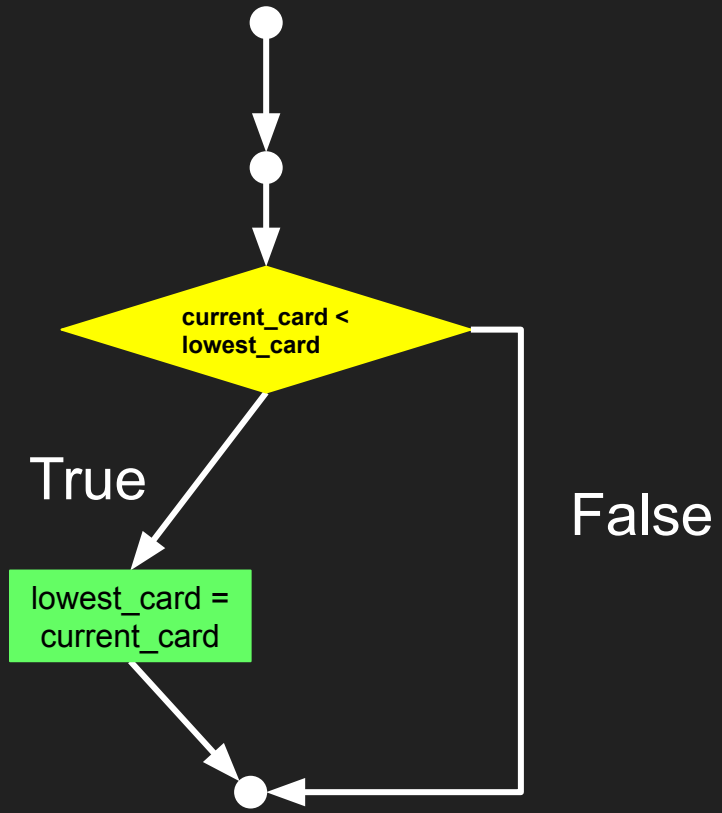

Loops

- Used to carry out statements in a program repeatedly an arbitrary number of times.

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Finding the low card pseudocode:

Loop

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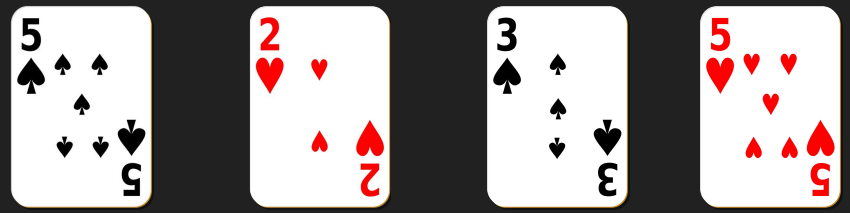

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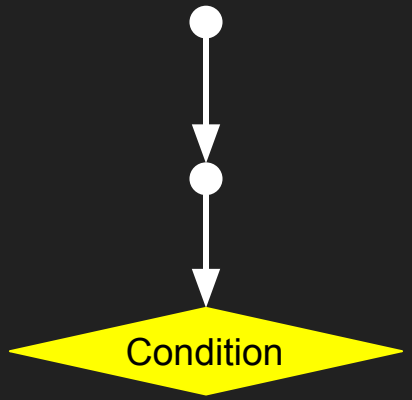

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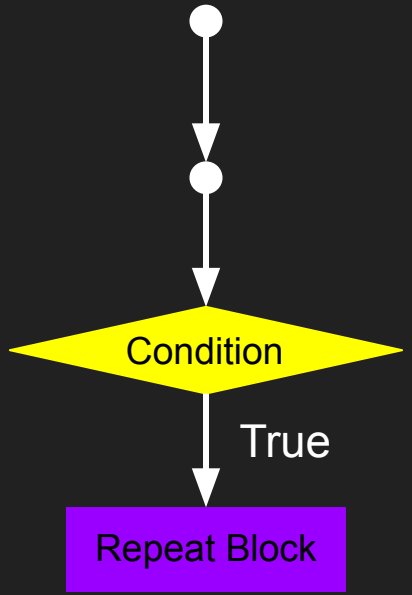

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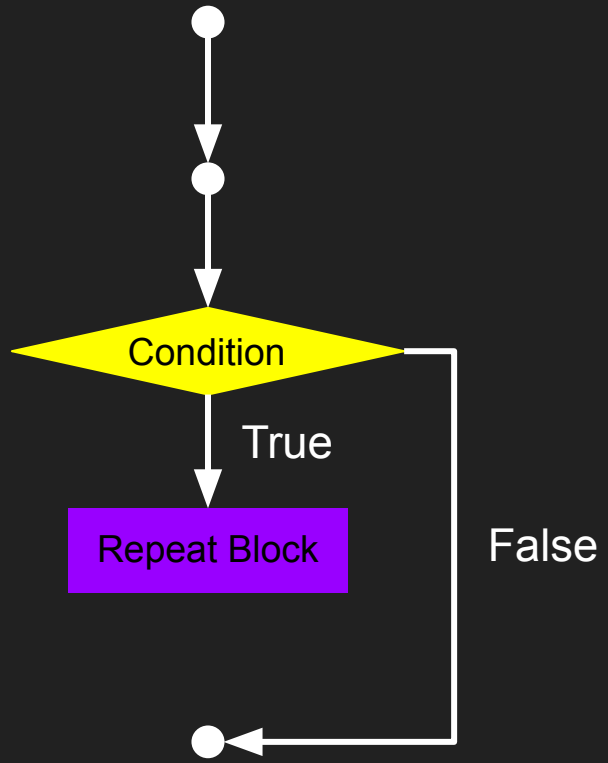

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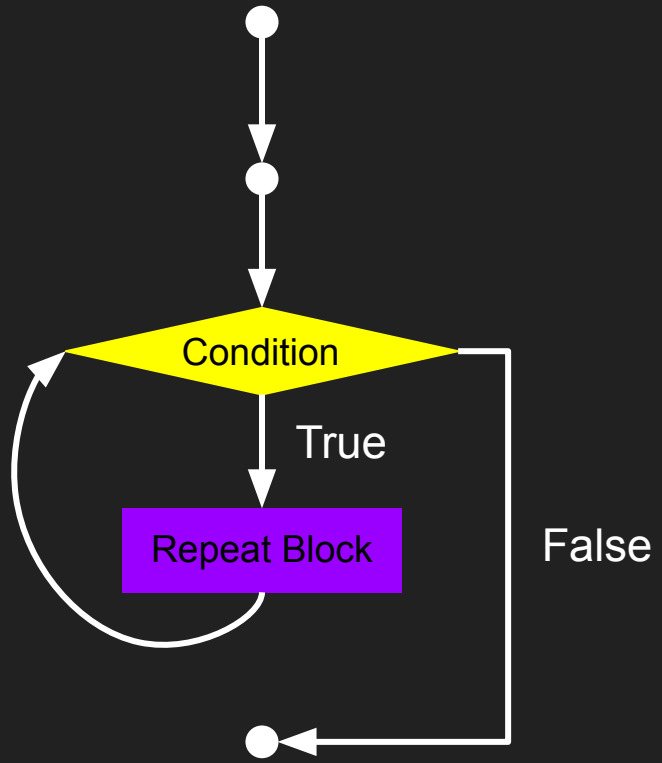
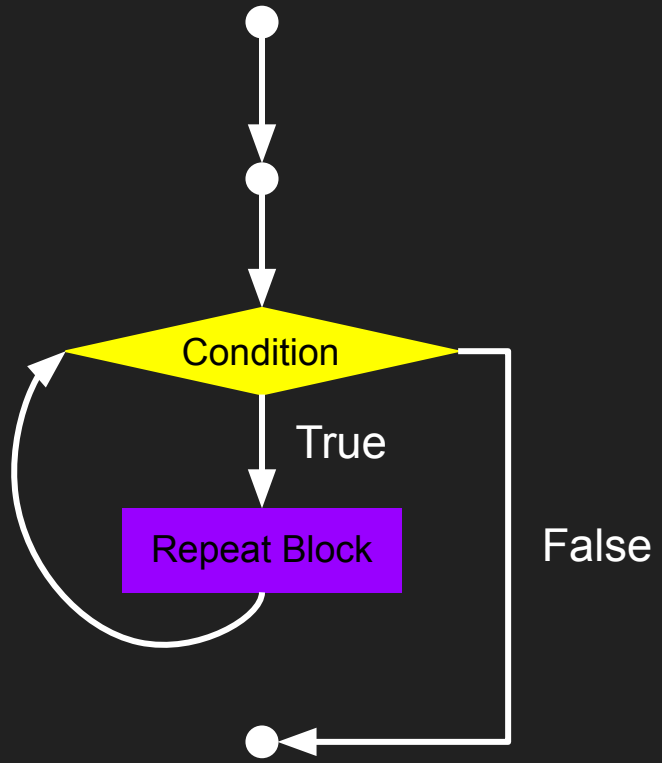


“While” Loops

Repeat while condition is true



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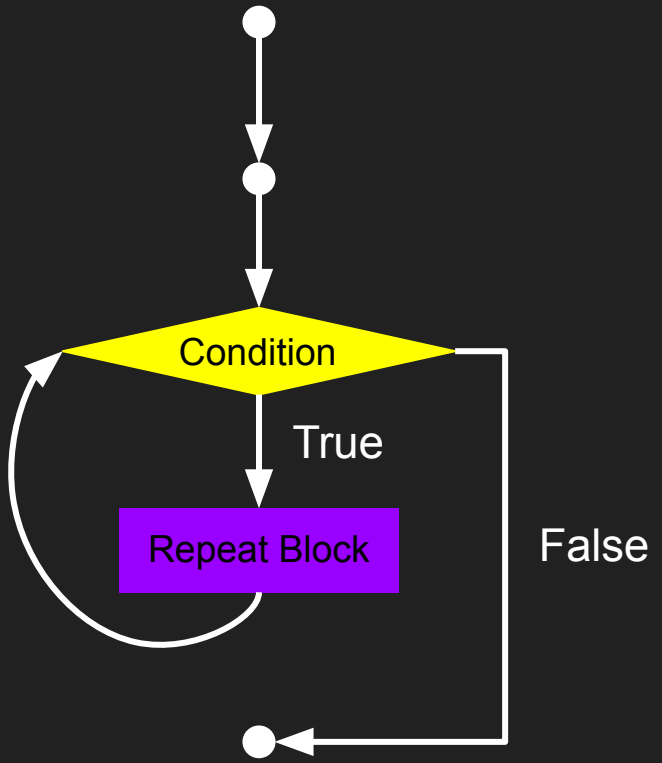

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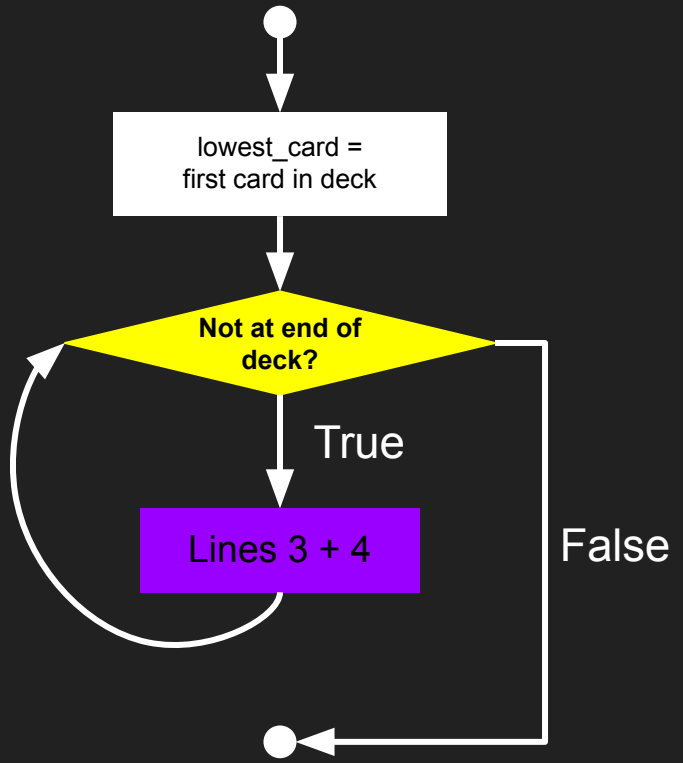

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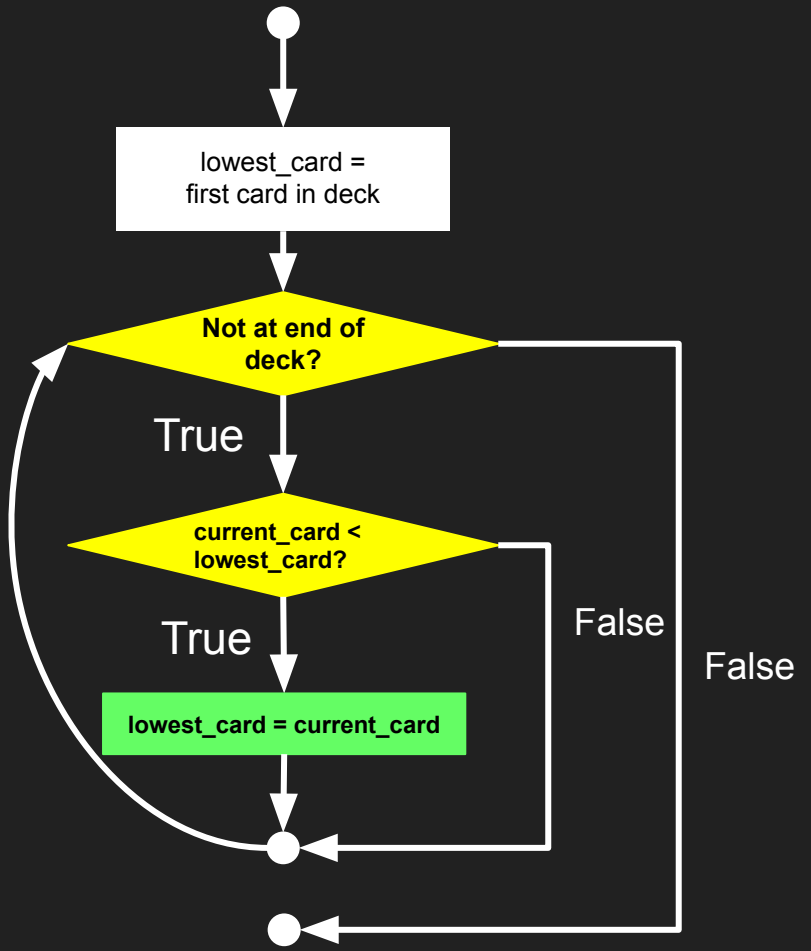
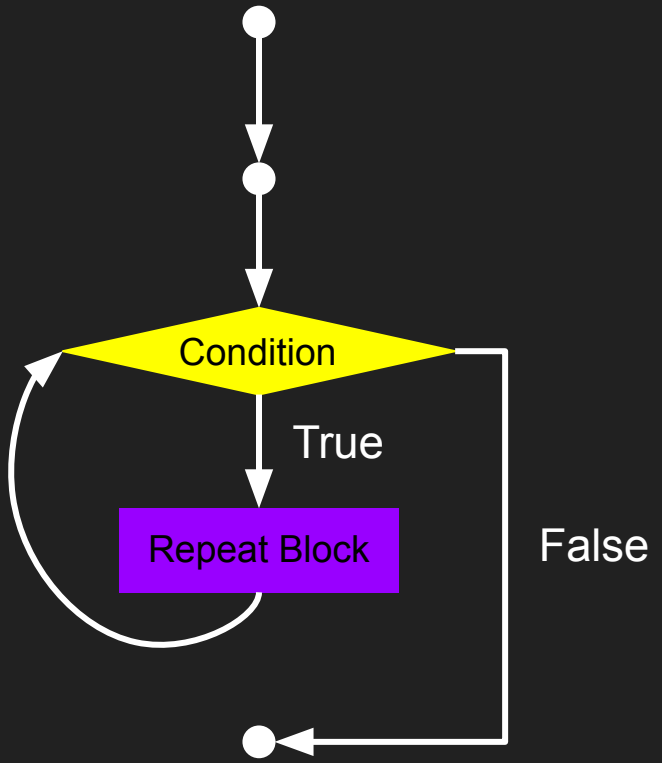


Syntax

```
while <condition>:
    <repeat action>
```



```python
"""Demonstrates while loops by finding low value in string"""

cards: str = "5235"

card_idx: int = 0
low_card: int = int(cards[0])
#look at each number in the string
while card_idx < 4:
    # check if current card is less than low card
    current_card: int = int(cards[card_idx])
    if (current_card < low_card):
        #update the low card to be the value of our current card
        low_card = current_card
    card_idx = card_idx + 1
print(low_card)
```

Practice Memory Diagram

```
1   def loop(stop: int) -> None:
2       condition: bool = True
3       num_loops: int = 0
4       while condition:
5           print(num_loops)
6           num_loops = num_loops + 1
7           if num_loops >= stop:
8               condition = False
9
10  loop(stop=2)
```

Practice Memory Diagram

```
1   def characters(msg: str) -> None:
2       index: int = 0
3       while index < len(msg):
4           print(msg[index])
5           index = index + 1
6
7   characters(msg="Howdy")
```

Bonus Lesson: Relative Reassignment Operators

Reassigning a variable relative to its current value: `i = i+ 1`

Addition reassignment operator shorthand has the same effect: `i += 1`

Since you will use meaningfully descriptive variable names, this is a big improvement!

`total_dollars= total_dollars+ next_donation` vs `total_dollars+= next_donation`

```python
def characters(msg: str) -> None:
    index: int = 0
    while index < len(msg):
        print(msg[index])
        index = index + 1

characters(msg="Howdy")
```

```
1  def characters(msg: str) -> None:
2      index: int = 0
3      while index < len(msg):
4          print(msg[index])
5          index += 1
6
7  characters(msg="Howdy")
```

Before	After
`i = i + expr`	`i += expr`
`i = i - expr`	`i -= expr`
`i = i * expr`	`i *= expr`
`i = i / expr`	`i /= expr`
`i = i % expr`	`i %= expr`
`i = i // expr`	`i //= expr`
`i = i ** expr`	`i **= expr`