Milestone Project 2

SECTION

Complete Python Bootcamp

- Now that you've learned about OOP, let's test your new skills with another Milestone Project.
- To warm-up, we will first guide you through creating a simple card game, then you will attempt the 2nd Milestone Project Exercise.

WARM UP PROJECT

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- To warm up for the 2nd Milestone Project we will recreate the card game called “War”.
- Let’s have a quick overview of the game.

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- To warm up for the 2nd Milestone Project we will recreate the card game called “War”.
- Let’s have a quick overview of the game.
    - **wikipedia.org/wiki/War_(card_game)**

Complete Python Bootcamp

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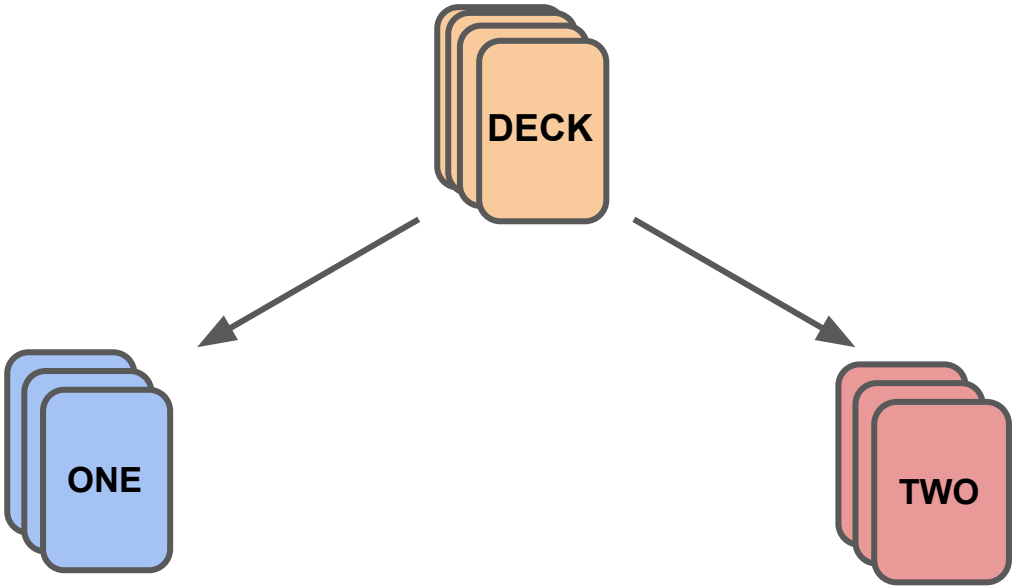

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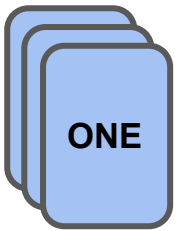

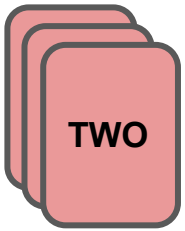

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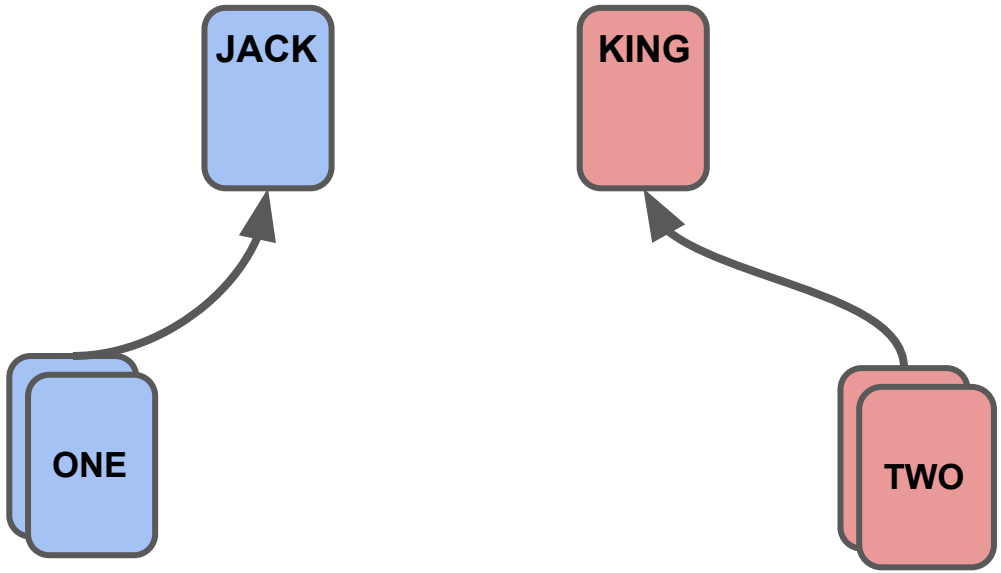

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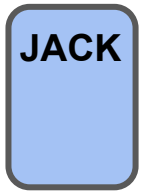

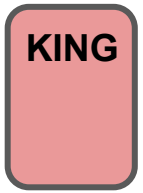

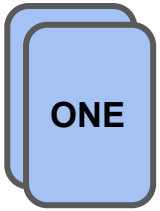

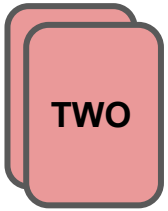

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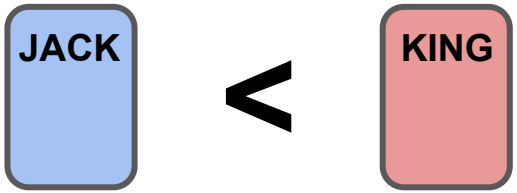

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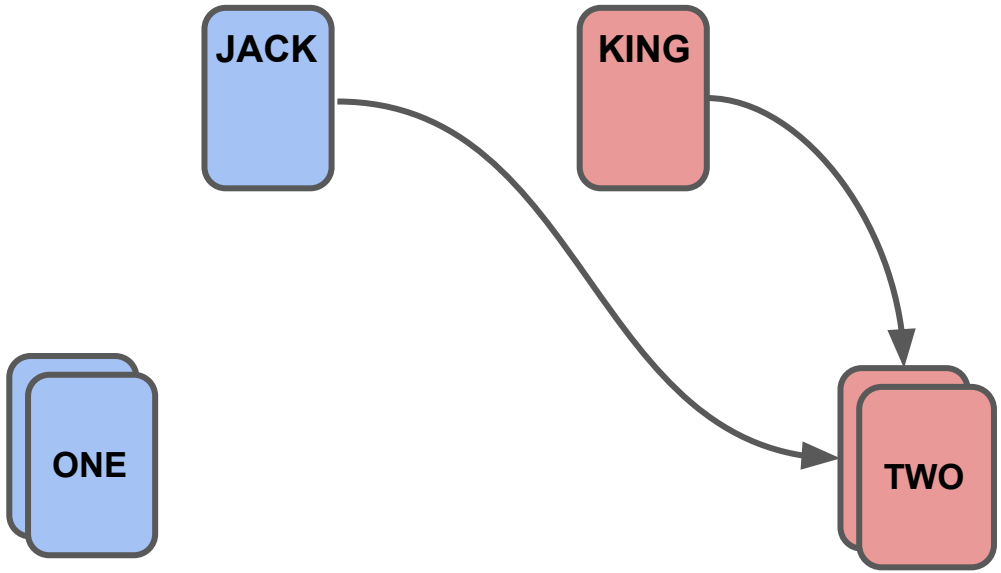

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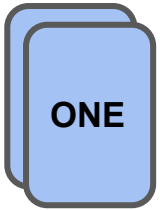

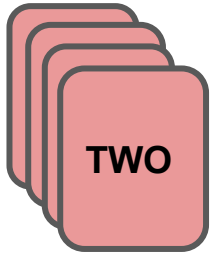

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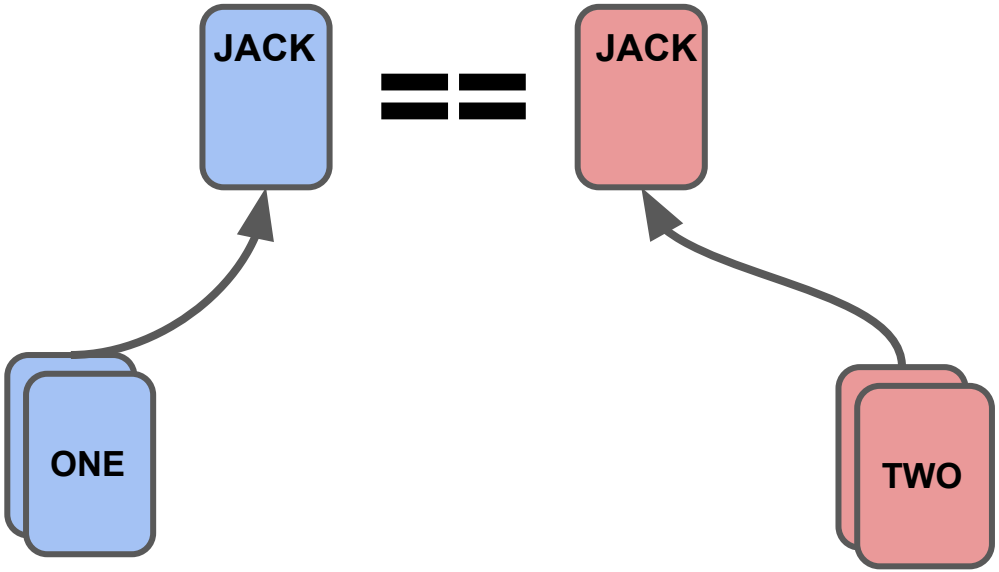

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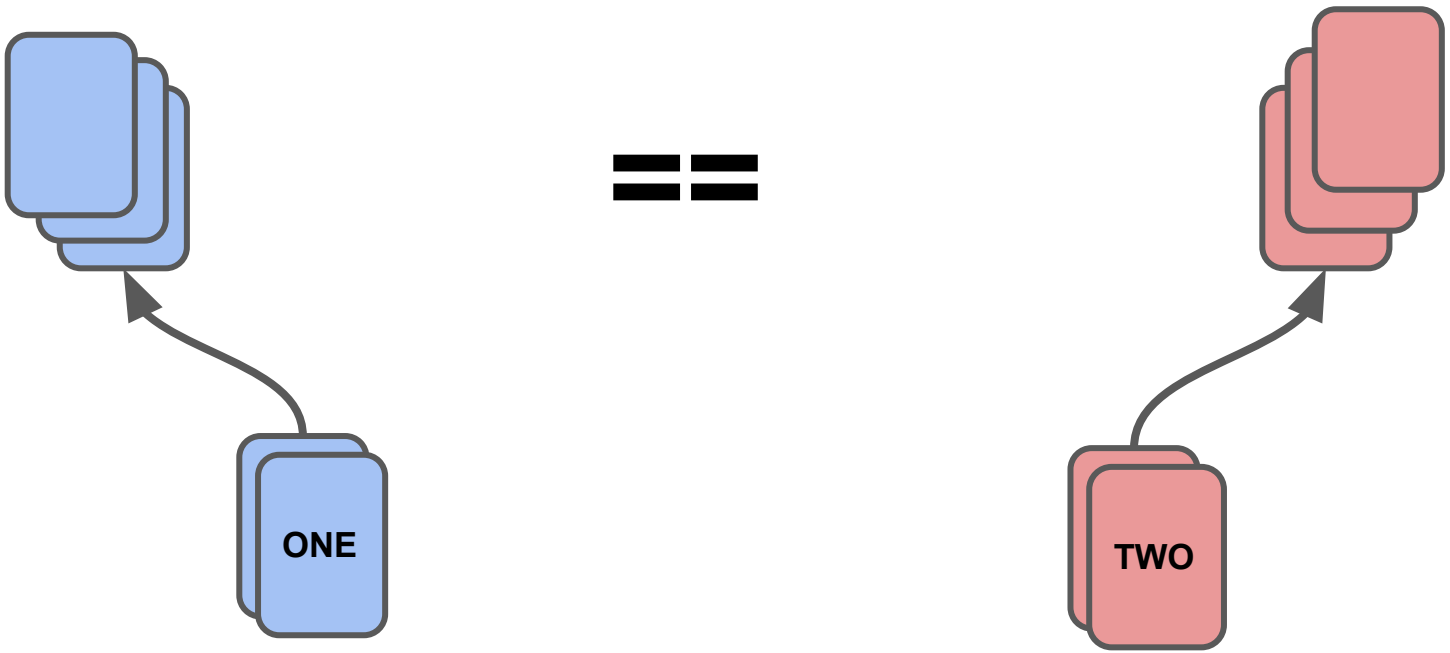

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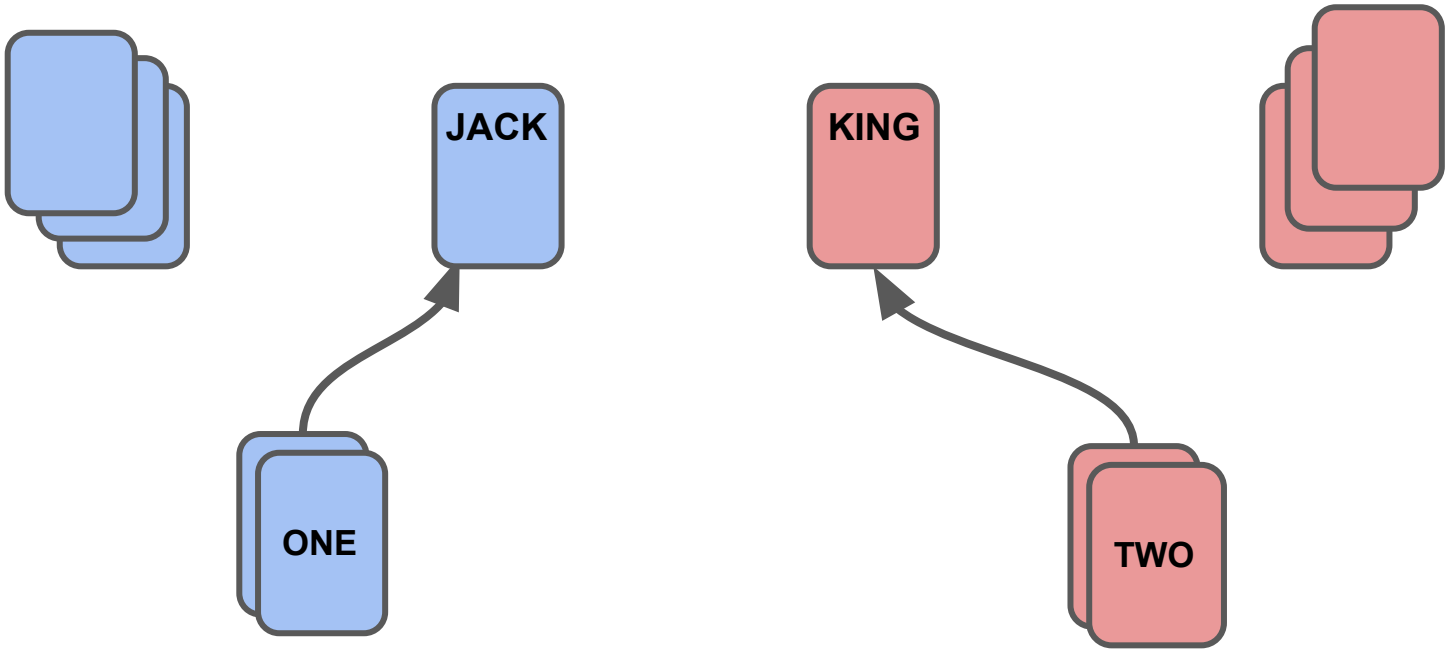

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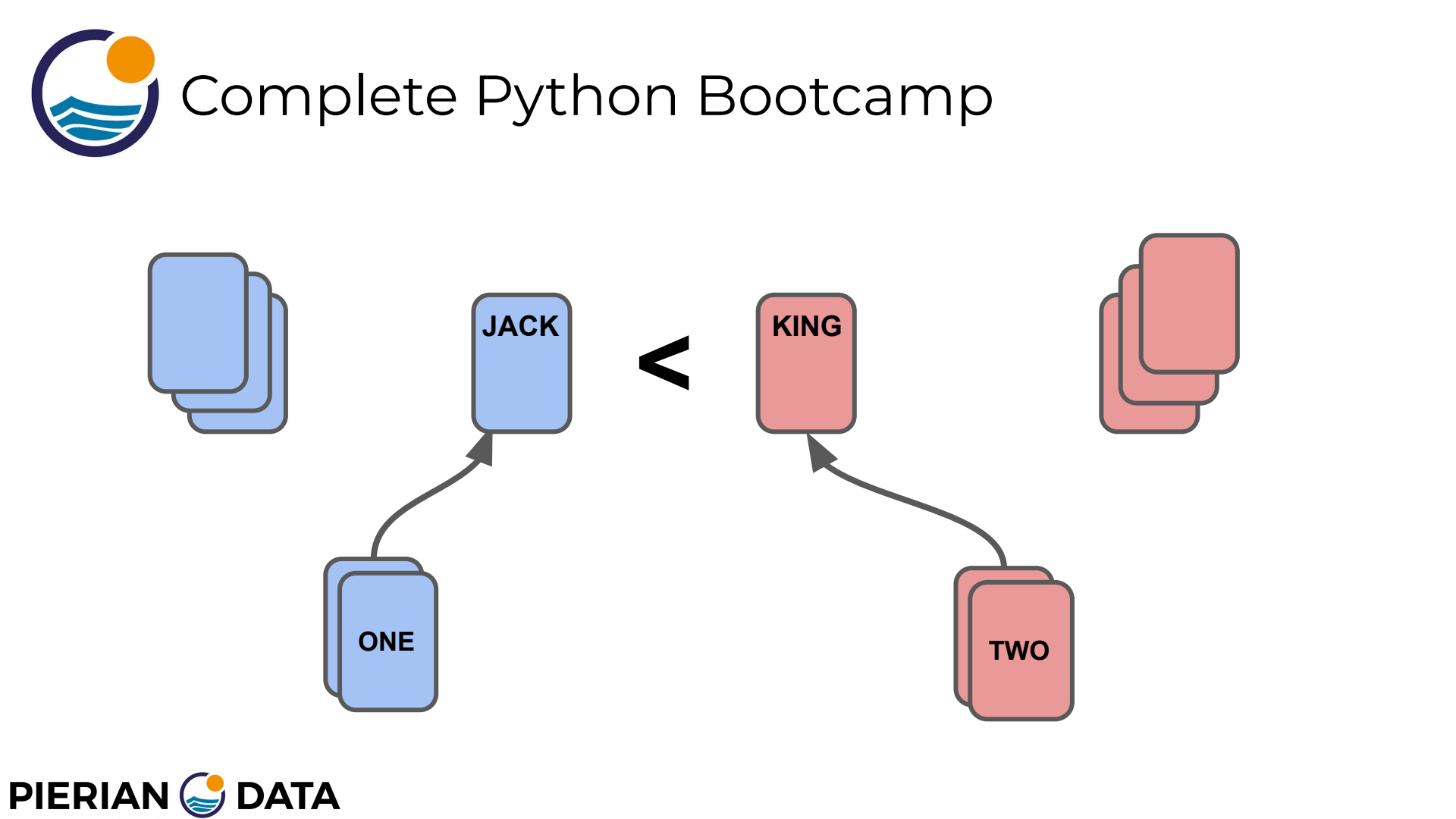
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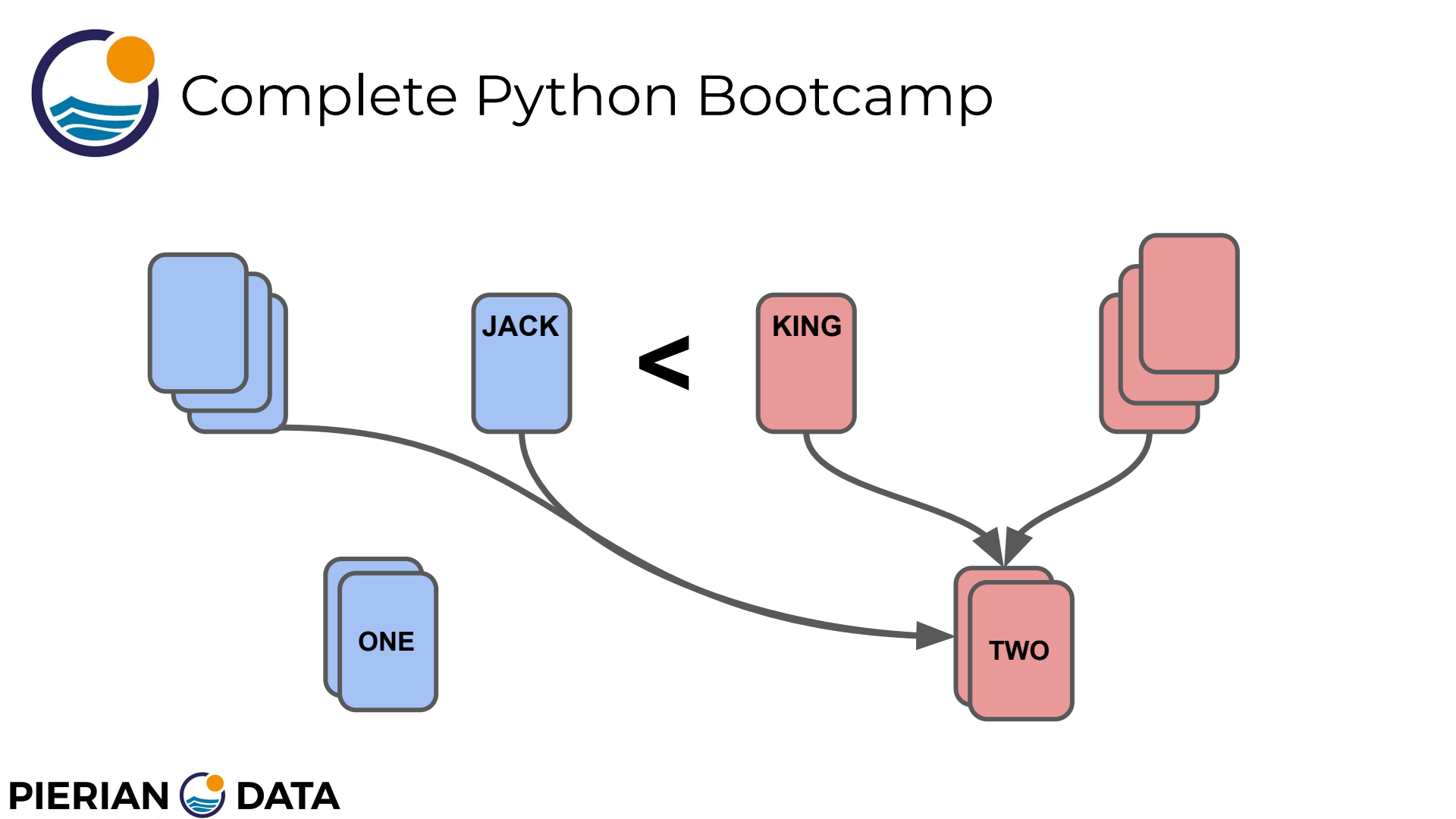
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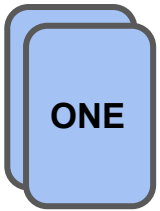

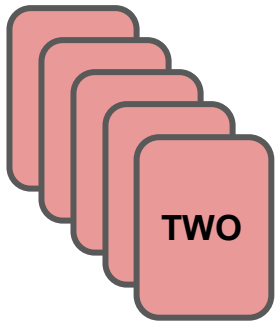

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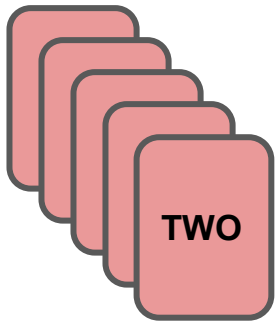

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- The “war” process can be repeated in this case of back to back ties.
- To construct this game, we will create:
    - Card Class
    - Deck Class
    - Player Class
    - Game Logic

Let’s get started!

Card Class

Deck Class

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- Deck Class
  - Instantiate a new deck
    - Create all 52 Card objects
    - Hold as a list of Card objects
  - Shuffle a Deck through a method call
    - Random library shuffle() function
  - Deal cards from the Deck object
    - Pop method from cards list

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- Deck Class
    - We will see that the Deck class holds a list of Card objects.
    - This means the Deck class will return Card class object instances, not just normal python data types.
- Let’s get started!

Player Class

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- Player Class
  - This class will be used to hold a player's current list of cards.
  - A player should be able to add or remove cards from their "hand" (list of Card objects).

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- Player Class
  - We will want the player to be able to add a single card or multiple cards to their list, so we will also explore how to do this in one method call.

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- Player Class
  - The last thing we need to think about is translating a Deck/Hand of cards with a top and bottom, to a Python list.
  - Let’s try to visualize this.

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- Player Class will have a self.all_cards list

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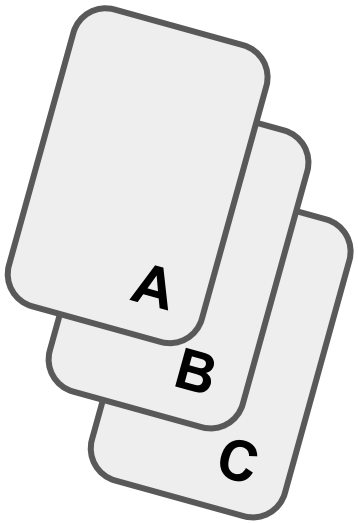

cards = [“A”, “B”, “C”]

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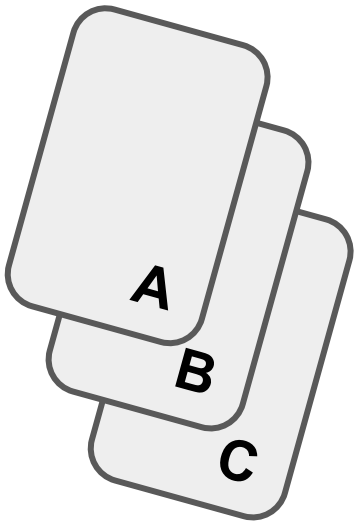
- Player Class will have a self.all_cards list



["A", "B", "C"]

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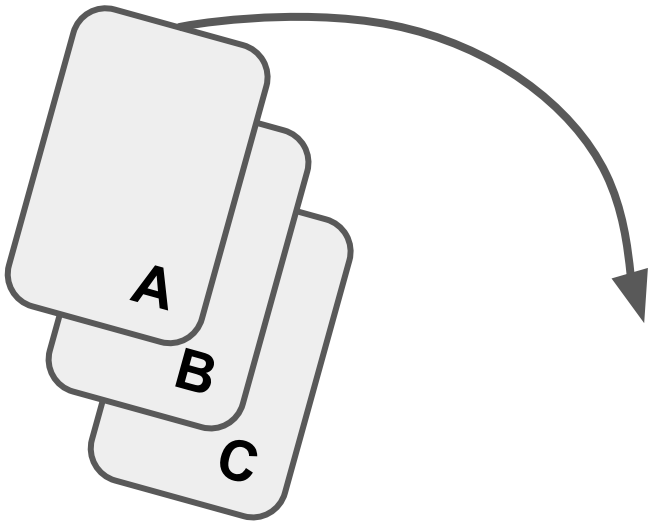
- A Player “plays” a card from the top



[“A”, “B”, “C”]

Complete Python Bootcamp

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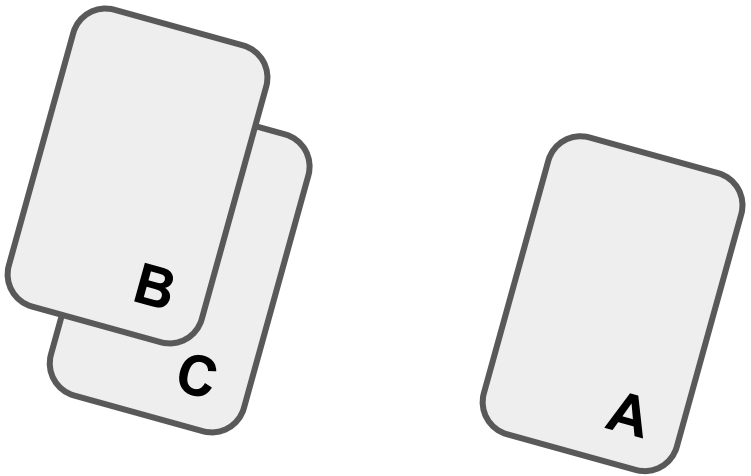

[“A”, “B”, “C”]

Complete Python Bootcamp

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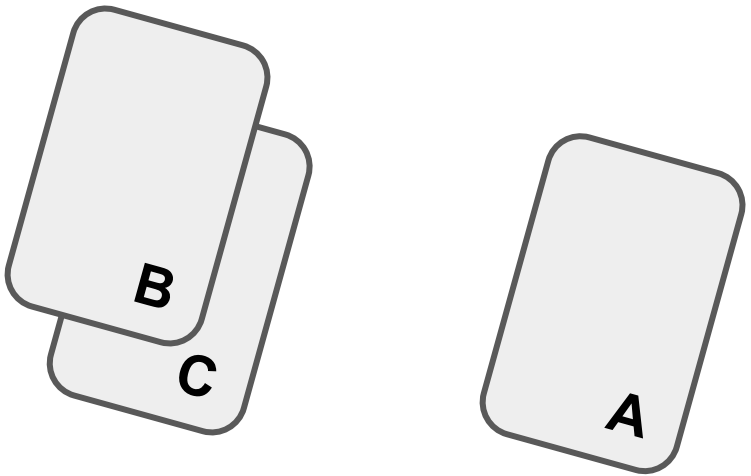
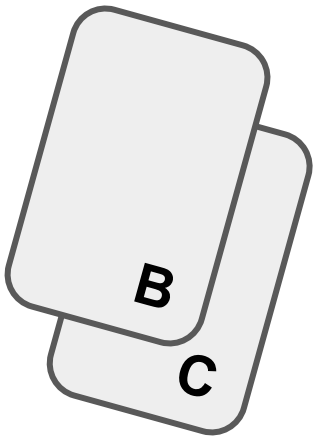


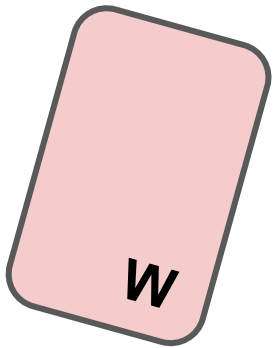
[“B”, “C”]

cards.pop(0)

Complete Python Bootcamp

- Players will add cards to the “bottom”





[“B”, “C”]

Complete Python Bootcamp

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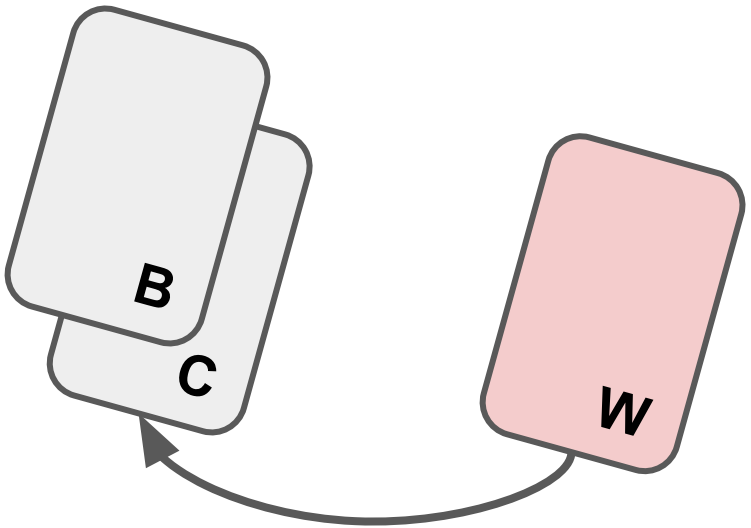
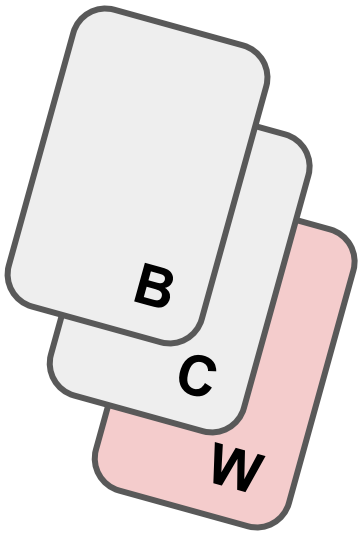


[“B”, “C”]

Complete Python Bootcamp

- Players will add cards to the “bottom”



[“B”, “C”, “W”]

cards.append(“W”)

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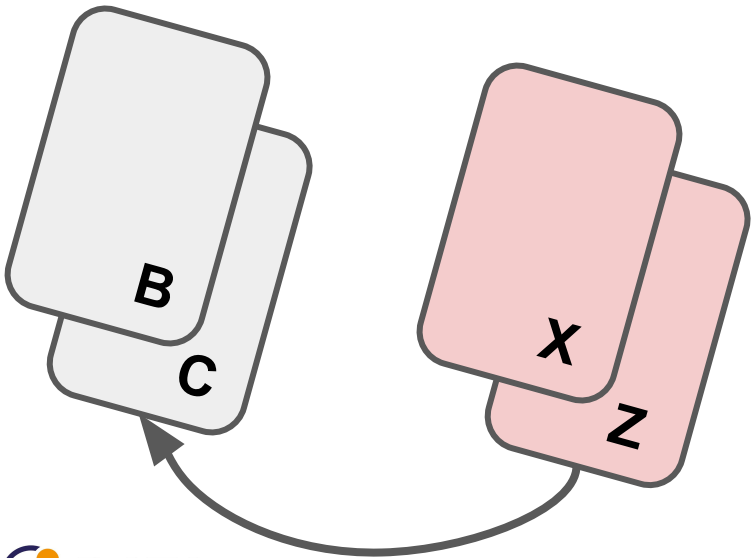
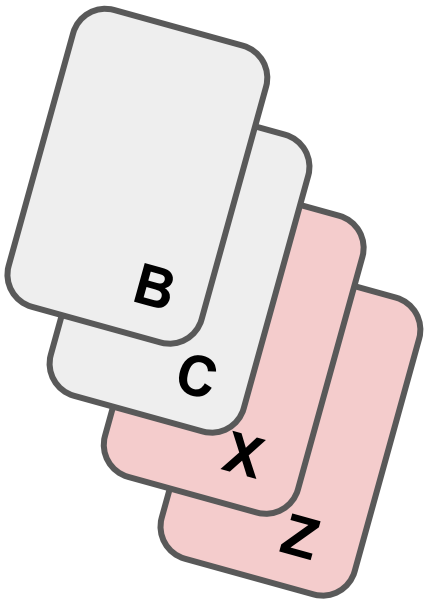
- Player adding multiple cards uses extend()



cards = [“B”, “C”]
new = [“X”, “Z”]

Complete Python Bootcamp

- Player adding multiple cards uses extend()



cards = [“B”, “C”]
new = [“X”, “Z”]

cards.extend(new)

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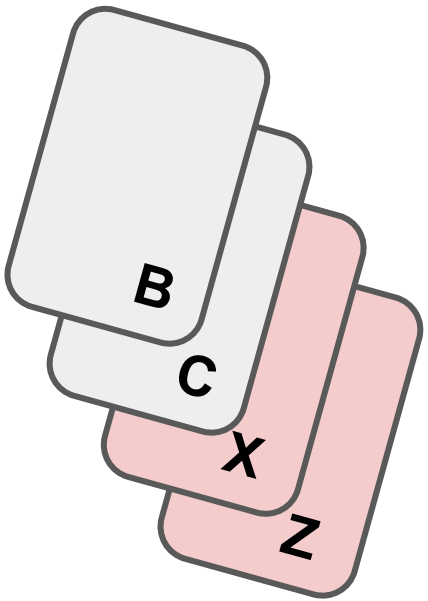
- Player adding multiple cards uses extend()



cards = [“B”, “C” ,“X”, “Z”]

cards.extend(new)

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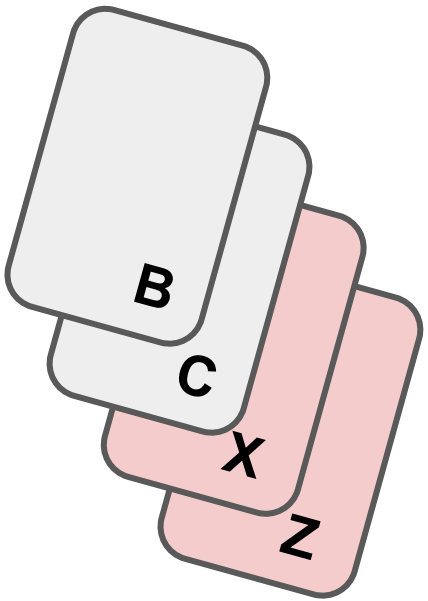
- Don’t use append() or lists become nested!



cards = [“B”, “C” ,[“X”, “Z”]]

cards.**append**(new)

Complete Python Bootcamp

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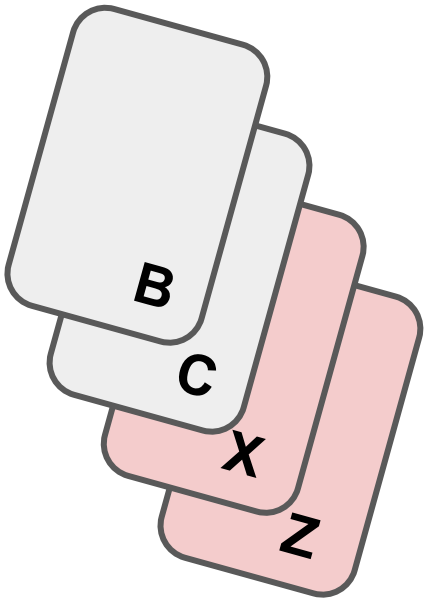

cards = [“B”, “C” ,[“X”, “Z”]]

cards.append(new)

Let’s get started!

Game Logic

PART ONE

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- Creating the overall logic is often the hardest part of a project like this!
- It is important to note, that we planned the classes around the upcoming logic, so in a real-world situation, you often think of both the logic and class structures simultaneously.

Complete Python Bootcamp

- Let’s outline our logic for the game!

Complete Python Bootcamp

- Let’s outline our logic for the game!

Player One

Player Two

Complete Python Bootcamp

- Let's outline our logic for the game!

Player One

Player Two

New Deck

Complete Python Bootcamp

- Let's outline our logic for the game!

Player One

Player Two

Shuffle

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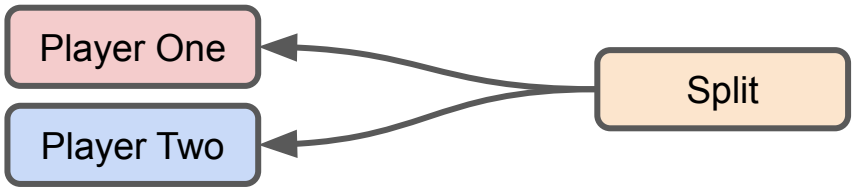
- Let's outline our logic for the game!



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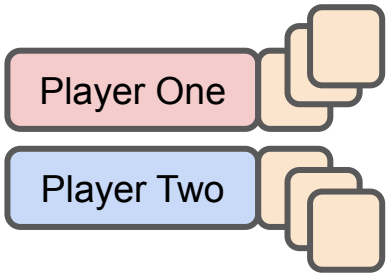

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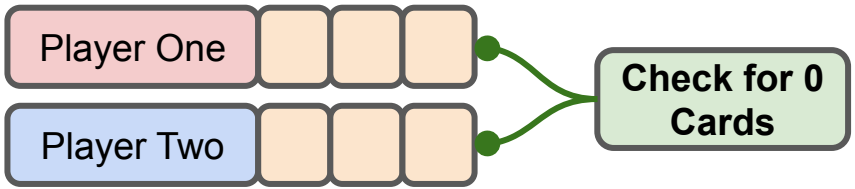

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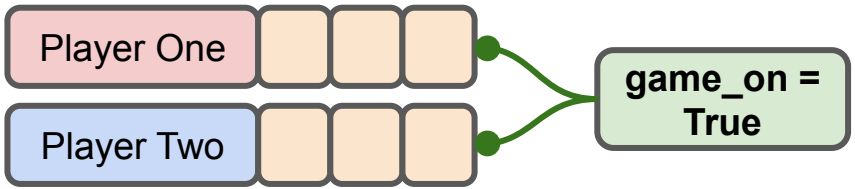

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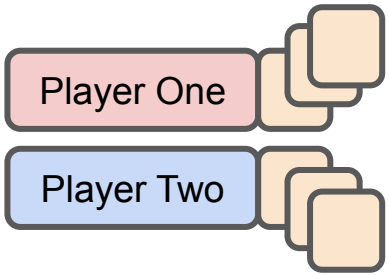

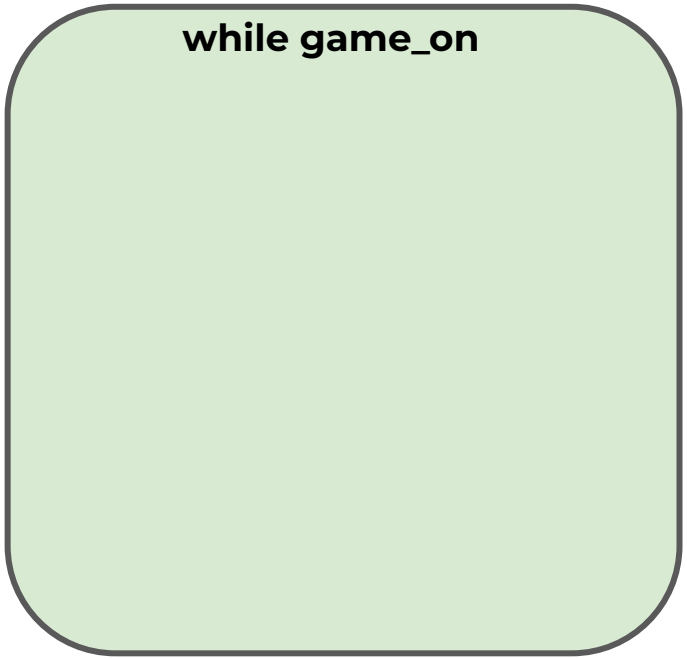

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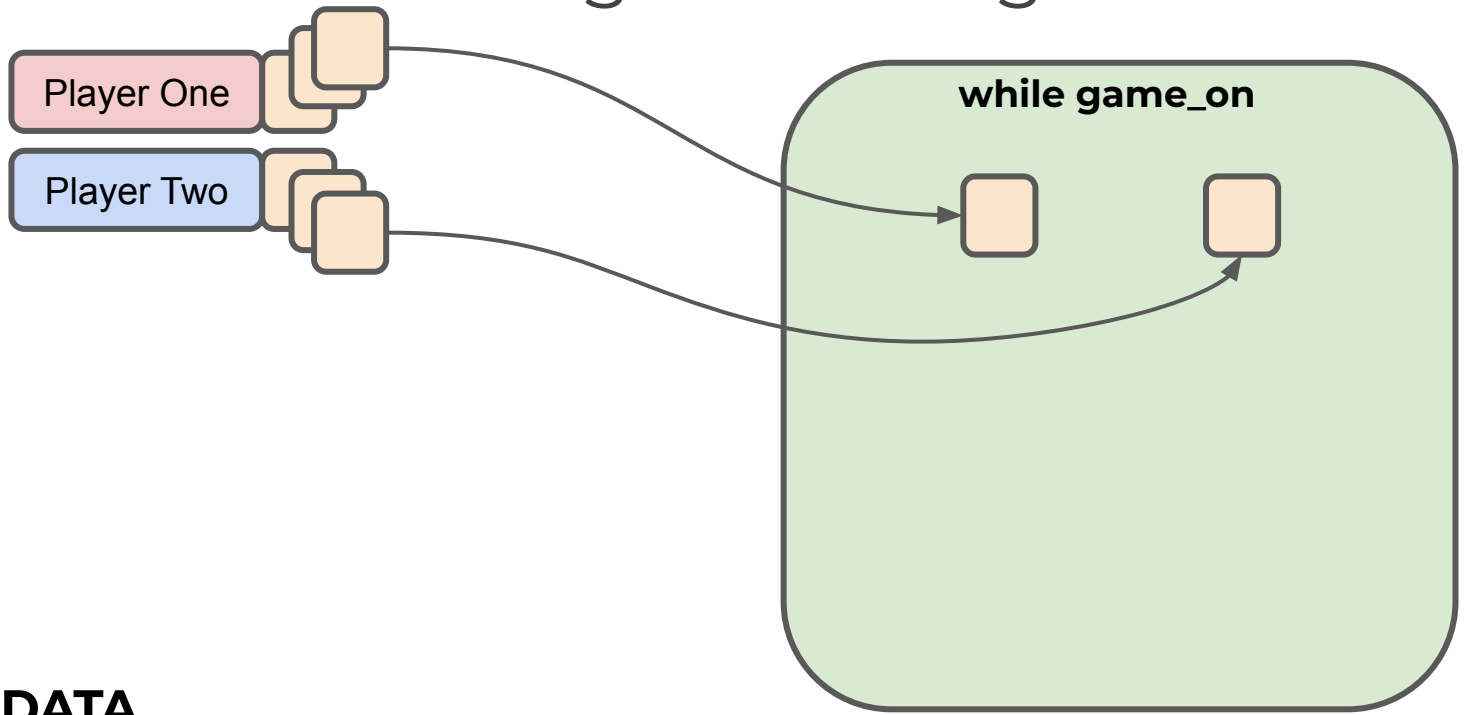

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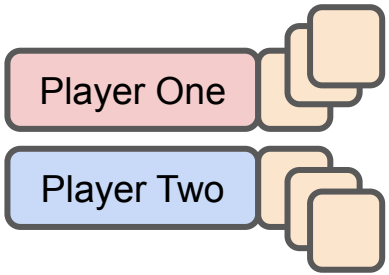

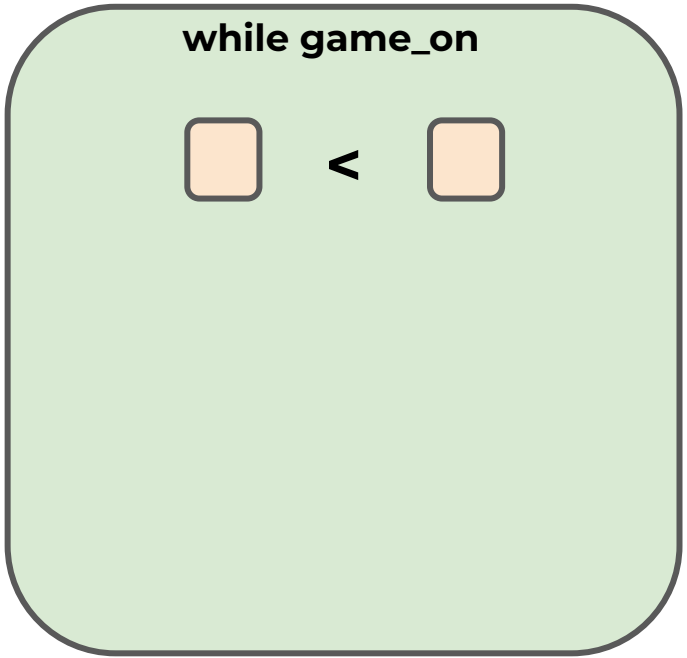

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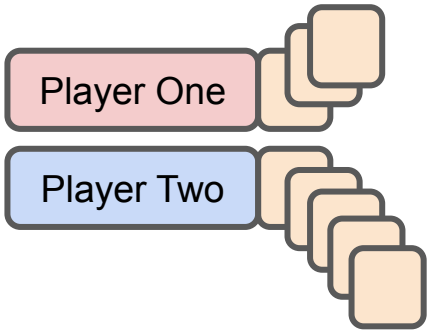

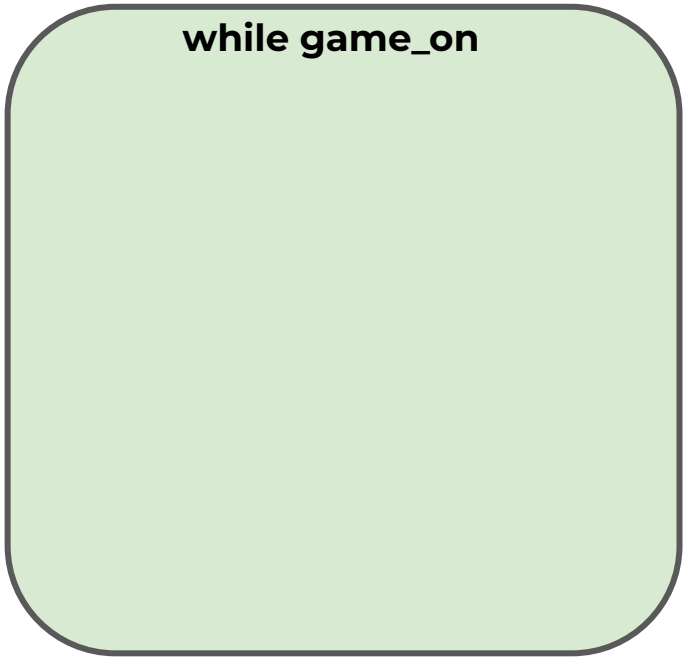

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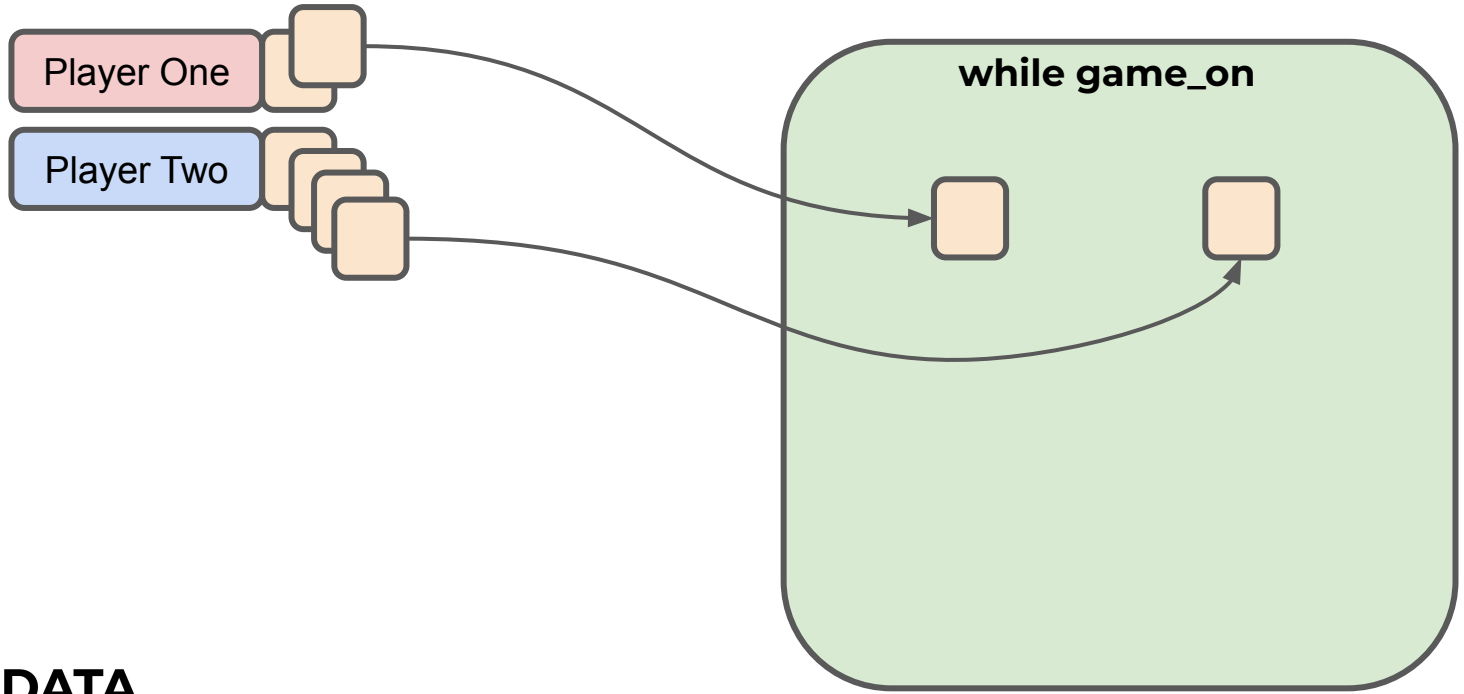

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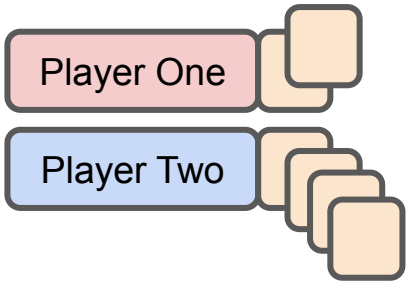
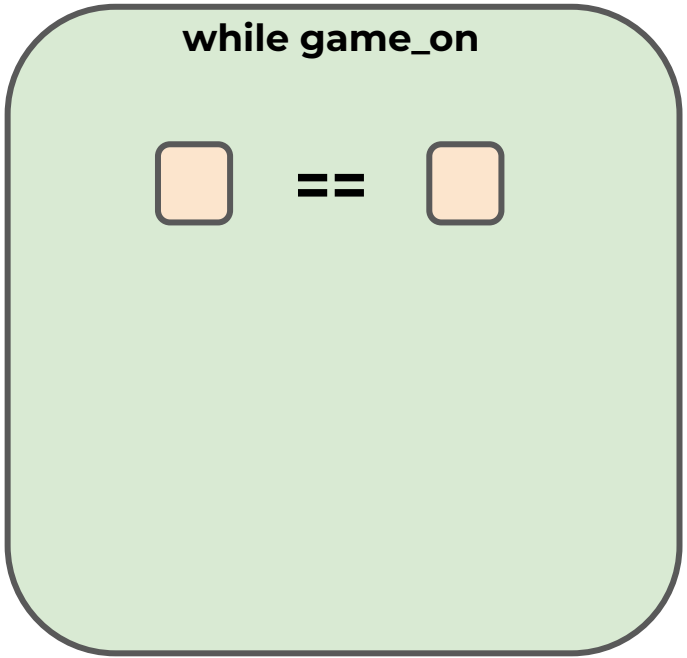
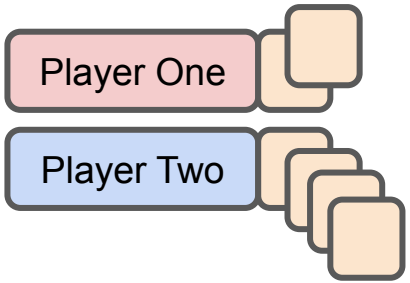
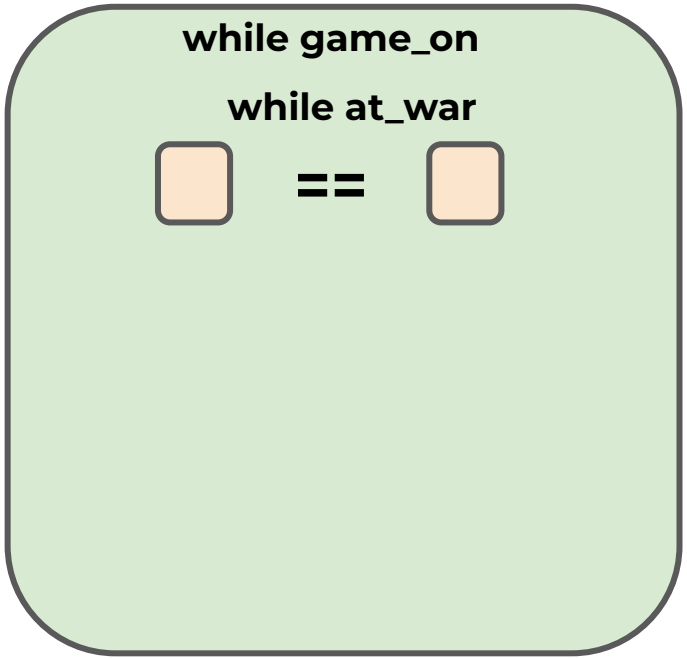




Complete Python Bootcamp

- Let's outline our logic for the game!





Complete Python Bootcamp

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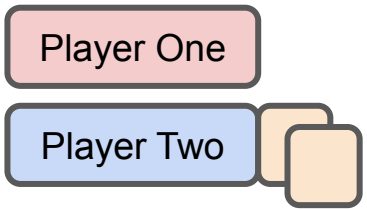

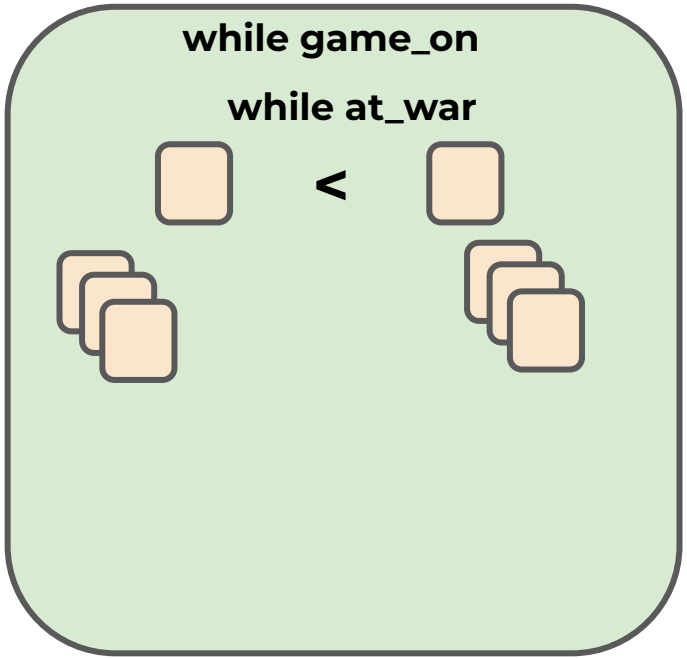

Complete Python Bootcamp

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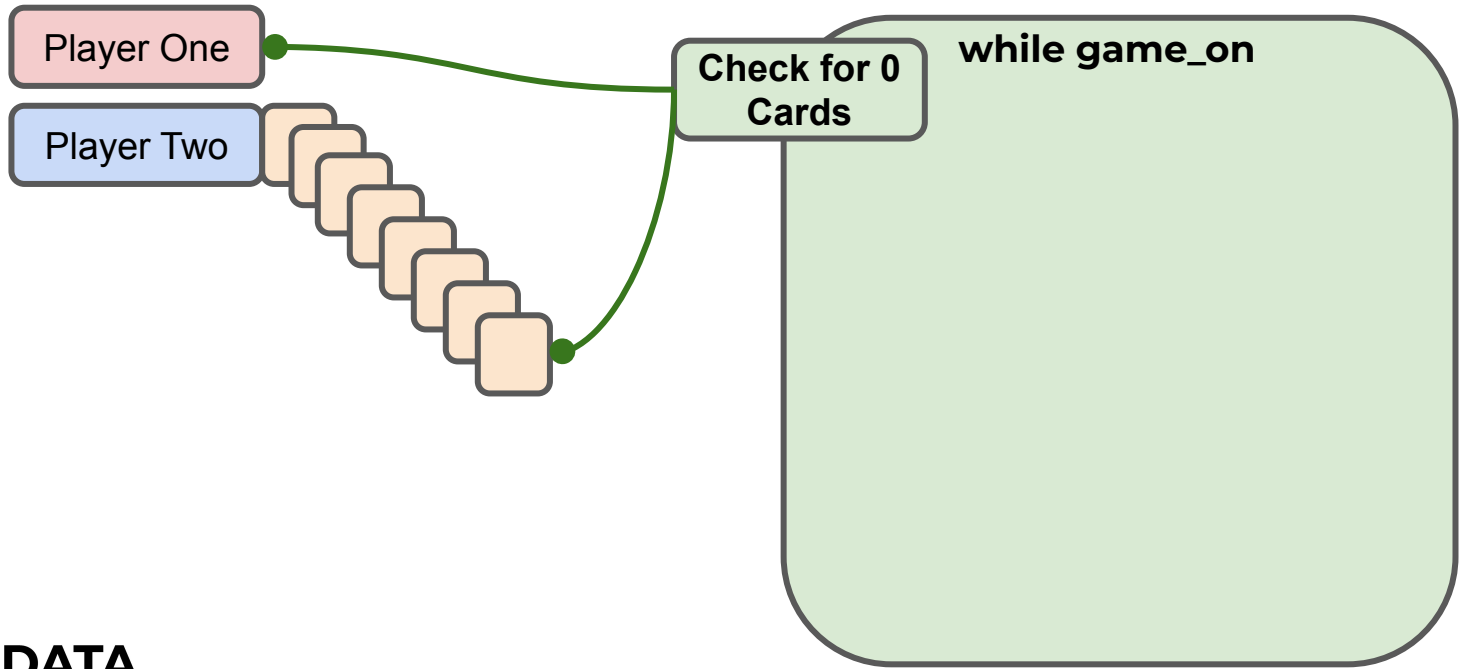
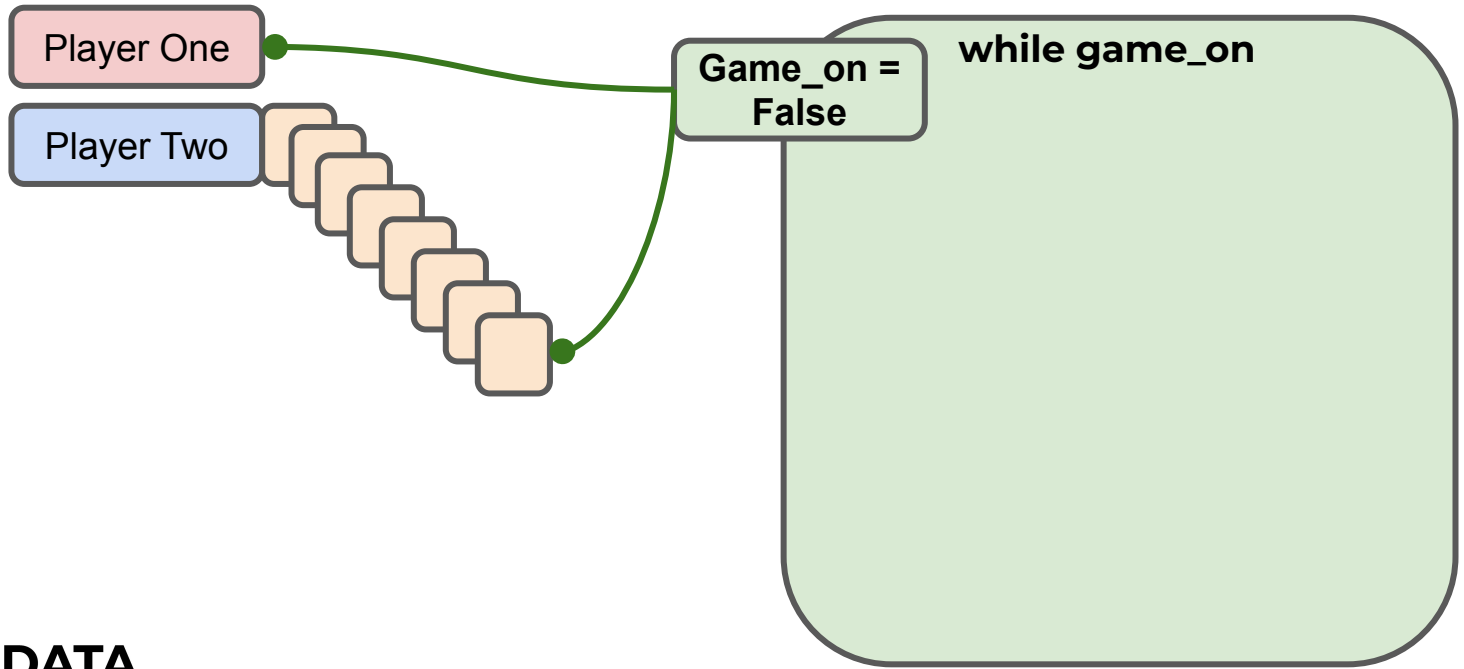


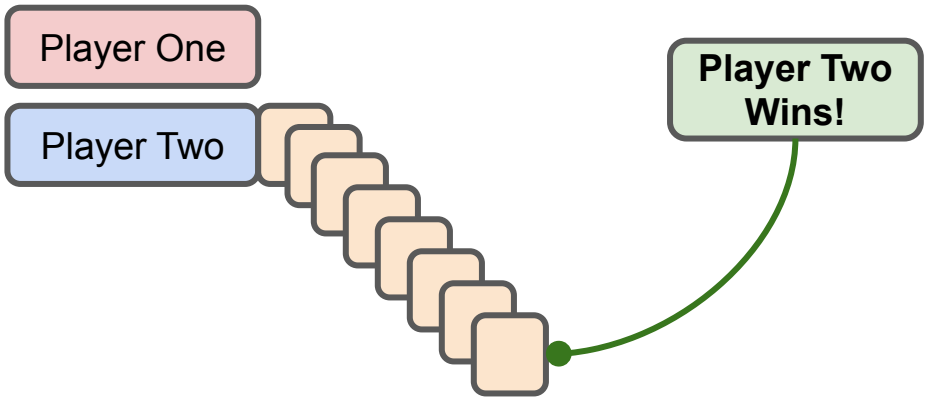
Complete Python Bootcamp

- Let's outline our logic for the game!



Complete Python Bootcamp

- Let's outline our logic for the game!



Game Logic

PART TWO

Game Logic

PART THREE

Complete Python Bootcamp

- Now it’s time to check the player’s cards against each other.
- There are lots of ways this can be done!
- We have 3 situations:
  - Player One > Player Two
  - Player One < Player Two
  - Player One == Player Two

Complete Python Bootcamp

- The way we will write this is with an if/elif/else within a while loop that assumes that a “war” has happened.
- We will state at_war = False if the players resolve the match-up on the first drawn card, otherwise we will add cards to the current cards on the table.

Complete Python Bootcamp

- The rules we'll use in this version is if there is a tie, each player needs to draw 5 additional cards.
- We'll also say that a player loses if they don't have at least 5 cards to play the war.
- This logic is easily edited to fit any rule structure you want.

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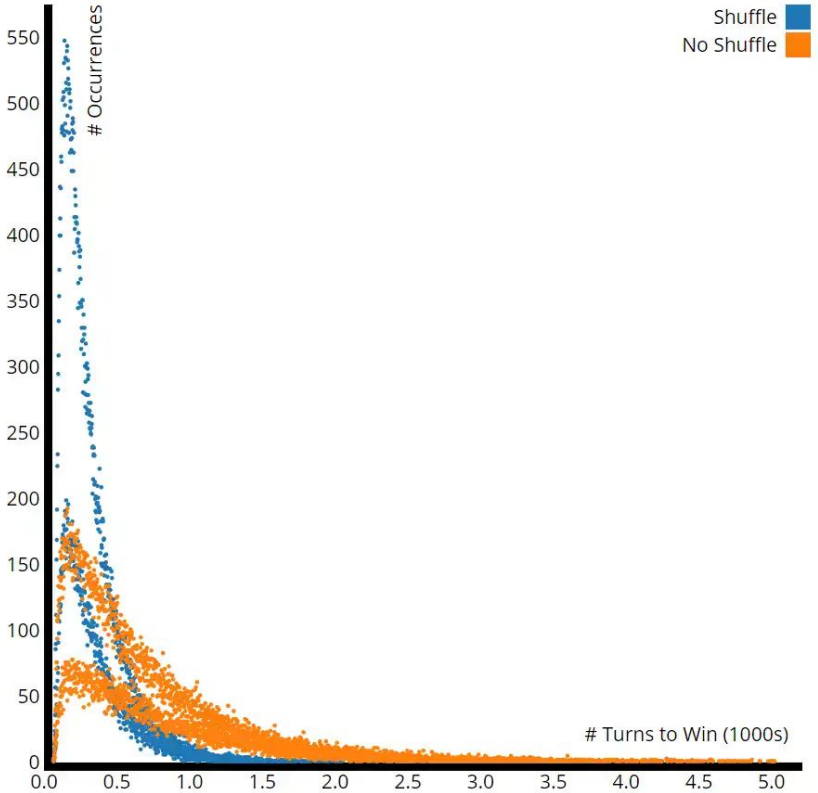

PIERIAN DATA

Complete Python Bootcamp

- Let’s quickly explore this loop visually before we code it out!

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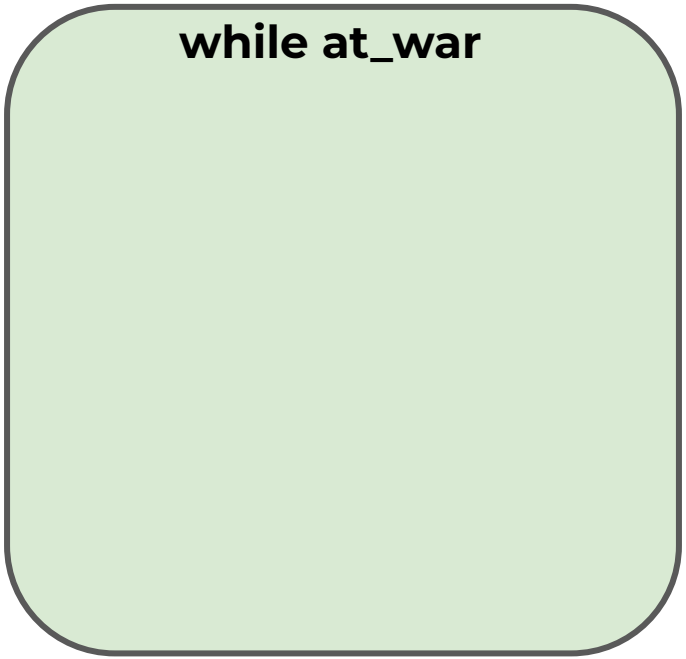
- Comparison Game Logic



Complete Python Bootcamp

at_war = True

while at_war

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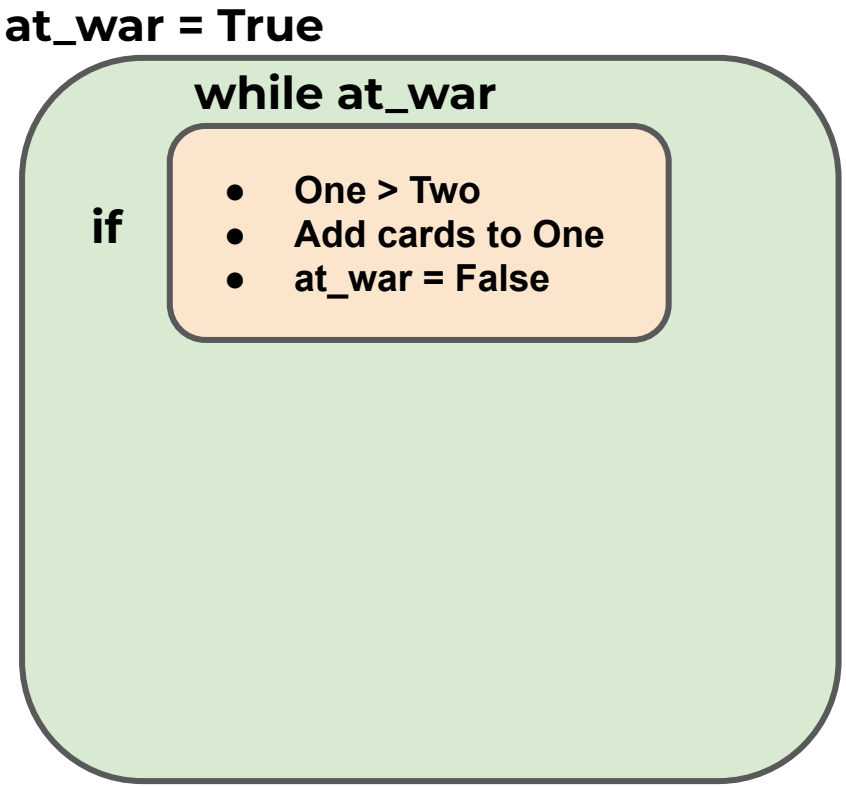
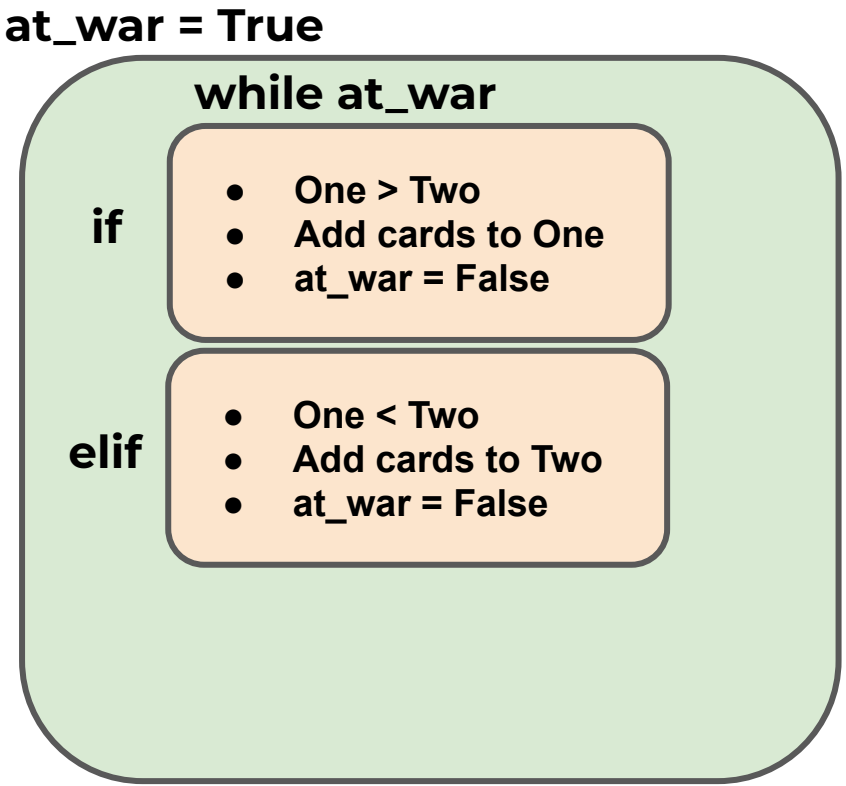
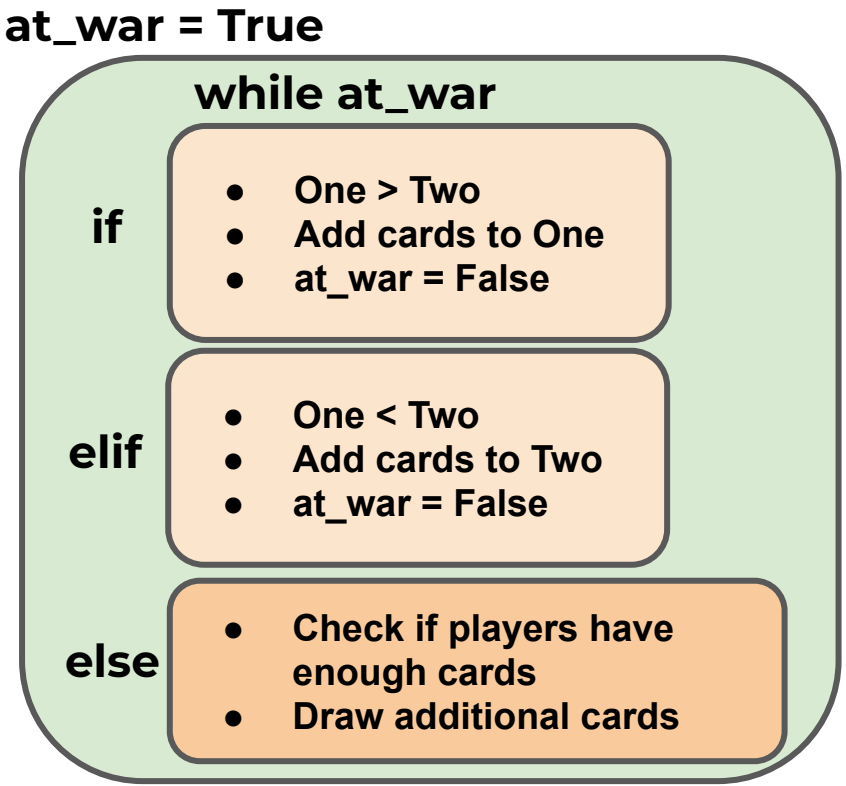


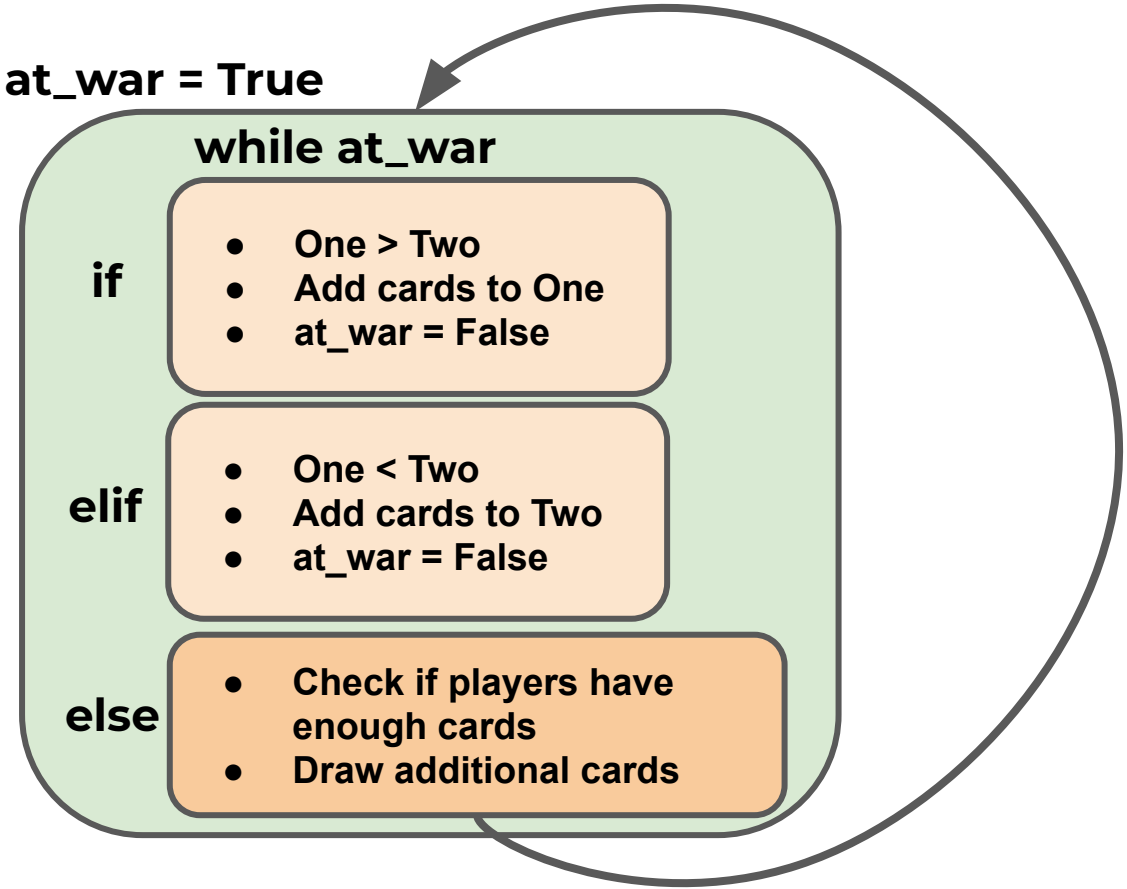
Complete Python Bootcamp



Complete Python Bootcamp



Complete Python Bootcamp



Milestone Project 2

PIERIAN DATA

Complete Python Bootcamp

- We've learned enough to start a second milestone project!
- You can treat this project a few ways:
    - Code along project with the solutions.
    - Attempt the project on your own.
    - Use the workbook as a guide for the project on your own.

Complete Python Bootcamp

- For this project you will use OOP to create a BlackJack Game with Python.
- Let’s quickly go over the main idea of the game and discuss how OOP should be used for this project.

Complete Python Bootcamp

- For our version of the game we will only have a computer dealer and a human player.
- We start with a normal deck of cards, you will create a representation of a deck with Python.

Complete Python Bootcamp

COMPUTER DEALER

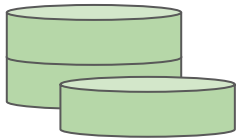
HUMAN PLAYER

PIERIAN DATA

Complete Python Bootcamp

COMPUTER DEALER

PLAYER PLACES A BET

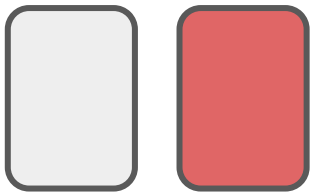


HUMAN PLAYER

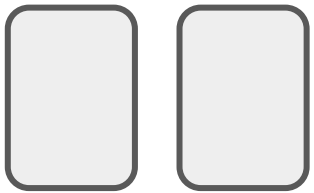
Complete Python Bootcamp

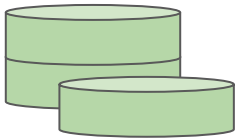
COMPUTER DEALER

Dealer starts with 1 card face up and 1 card face Down



Player starts with 2 cards face up





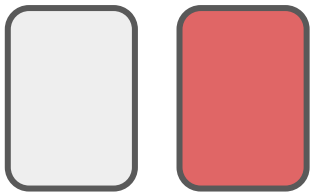
HUMAN PLAYER

PIERIAN DATA

Complete Python Bootcamp

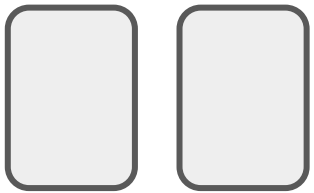
COMPUTER DEALER

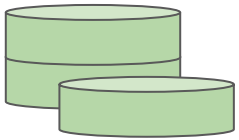
Dealer starts with 1 card face up and 1 card face Down



PLAYER GOES FIRST IN GAMEPLAY

Player starts with 2 cards face up



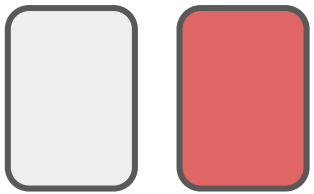


HUMAN PLAYER

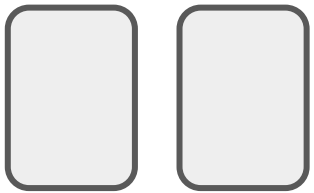
PIERIAN DATA

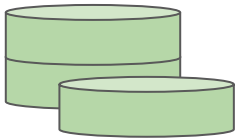
Complete Python Bootcamp

COMPUTER DEALER



HIT for more cards from DECK





HUMAN PLAYER

PLAYER GOAL: Get closer to a total value of 21 than the dealer does.

Possible Actions:

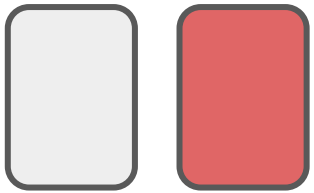
1. **Hit** (Receive another card)
2. **Stay** (Stop Receiving Cards)

We'll ignore actions like "Insurance", "Split", or "Double Down"

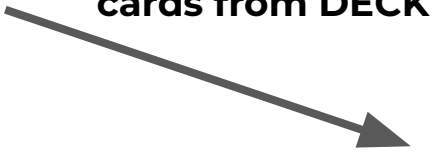
PIERIAN DATA

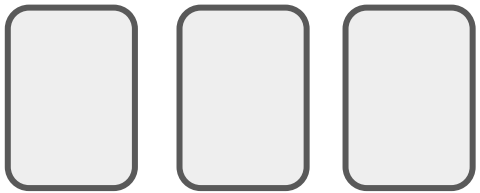
Complete Python Bootcamp

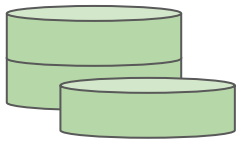
COMPUTER DEALER



HIT for more cards from DECK







HUMAN PLAYER

PLAYER GOAL: Get closer to a total value of 21 than the dealer does.

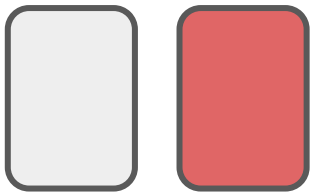
Possible Actions:

1. **Hit** (Receive another card)
2. **Stay** (Stop Receiving Cards)

We'll ignore actions like "Insurance", "Split", or "Double Down"

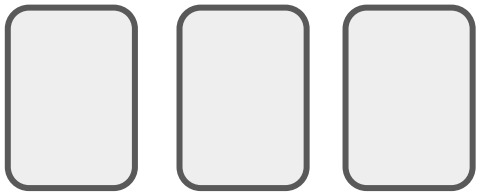
Complete Python Bootcamp

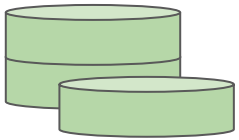
COMPUTER DEALER



Dealer HIT for more cards from DECK

AFTER PLAYER TURN:
2. If player is under 21, dealer then hits until they either beat the player or the dealer busts.

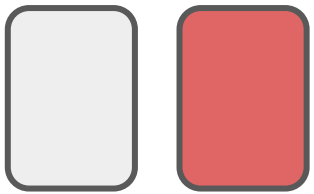


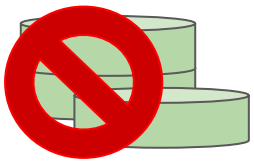


HUMAN PLAYER

GAME END: PLAYER BUSTS

COMPUTER DEALER





HUMAN PLAYER

AFTER PLAYER TURN:

1. If player keeps hitting goes over 21, they bust and lost the bet!

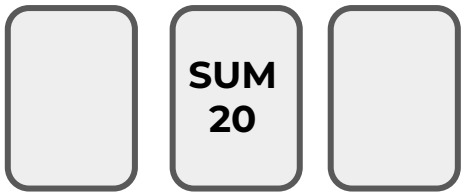
The game is then over and dealer collects the money.

PIERIAN DATA

GAME END: Computer Beats Player

COMPUTER DEALER

Computer sum higher than player sum **and** still under 21.



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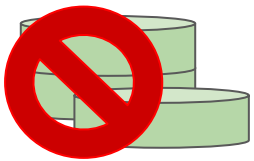
2. If player is under 21, dealer then hits until they either beat the player or the dealer busts.



HUMAN PLAYER

PIERIAN DATA

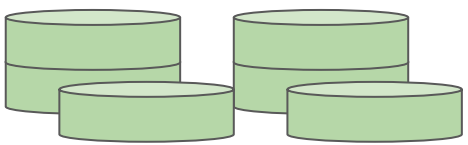
GAME END: PLAYER WINS

COMPUTER DEALER

SUM OVER 21

DECK

AFTER PLAYER TURN:
2. If player is under 21, dealer then hits until they either beat the player or the dealer busts.



HUMAN PLAYER

PIERIAN DATA

Complete Python Bootcamp

- Special Rules:
  - Face Cards (Jack,Queen, King) count as a value of 10.
  - Aces can count as either 1 or 11 whichever value is preferable to the player.

Complete Python Bootcamp

- Check out the resource links for other explanations of BlackJack for more information.
- Let’s now explore the project itself and the workbook!

Milestone Project 2 Example Solution