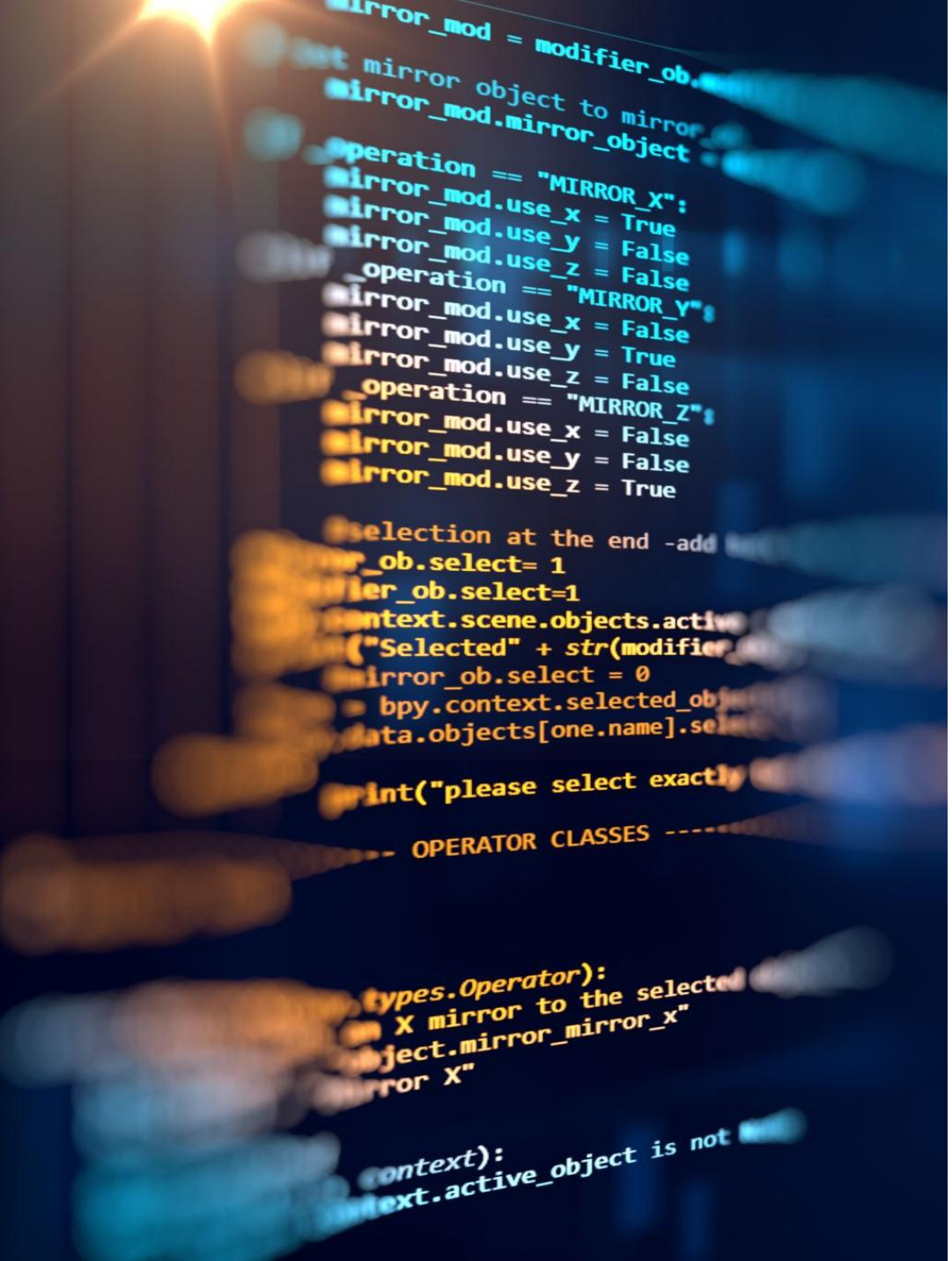
Introduction to Python for Games

Year 9 Engineering: Lets Make Games!



Learning Intention:

Learn to tell stories with code!

Success Criteria:

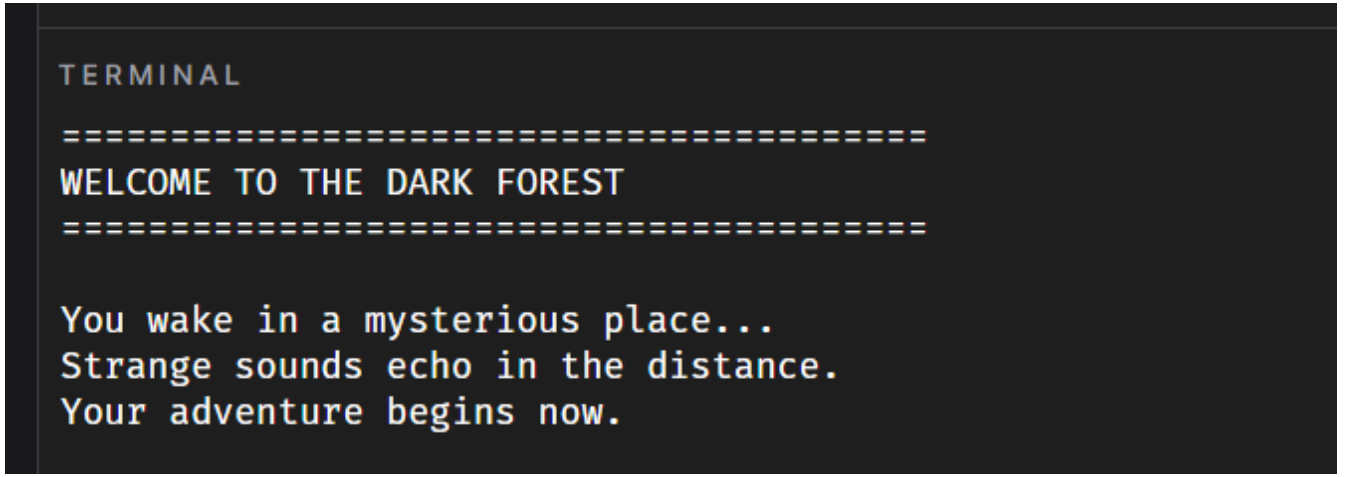
- display text to players
- get input from players
- remember information (variables)

Example: Printing story elements on screen

main.py BasicGame.py demoCode.py

```python
print("=" * 40)
print("WELCOME TO THE DARK FOREST")
print("=" * 40)
print()
print("You wake in a mysterious place...")
print("Strange sounds echo in the distance.")
print("Your adventure begins now.")

```



Example: Getting user input

main.py BasicGame.py demoCode.py

```
1   player_name = input("What is your name, traveler? ")
2
```

1. Python displays the question
2. Waits for the player to type
3. Stores their answer in the **variable** ‘name’

Variables

Think of variables as labeled boxes:

- The box has a name (player_name)
- You can put information inside it
- You can look at what's inside anytime

Example: Getting more user input

main.py BasicGame.py demoCode.py

```
1   player_name = input("What is your name, traveler? ")
2   character_class = input("Are you a Warrior, Mage, or Rogue? ")
3   hometown = input("What village do you call home? ")
```

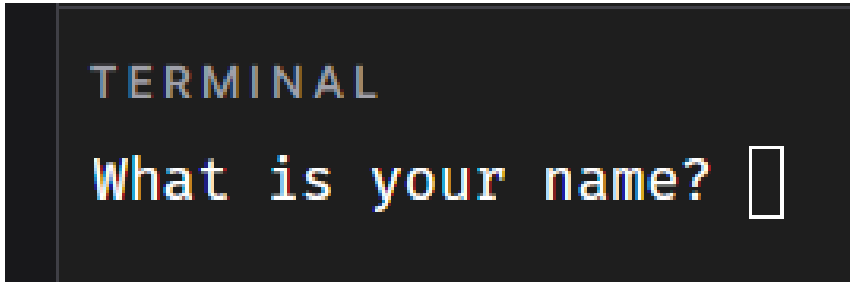
TERMINAL

```
What is your name, traveler? Link
Are you a Warrior, Mage, or Rogue? Warrior
What village do you call home? Hyrule
```

Example: Displaying user input

main.py BasicGame.py demoCode.py

```
1   name = input("What is your name? ")
2   print(f"Welcome, {name}!")
3   print(f"Hello, {name}. Your quest begins!")
4
```



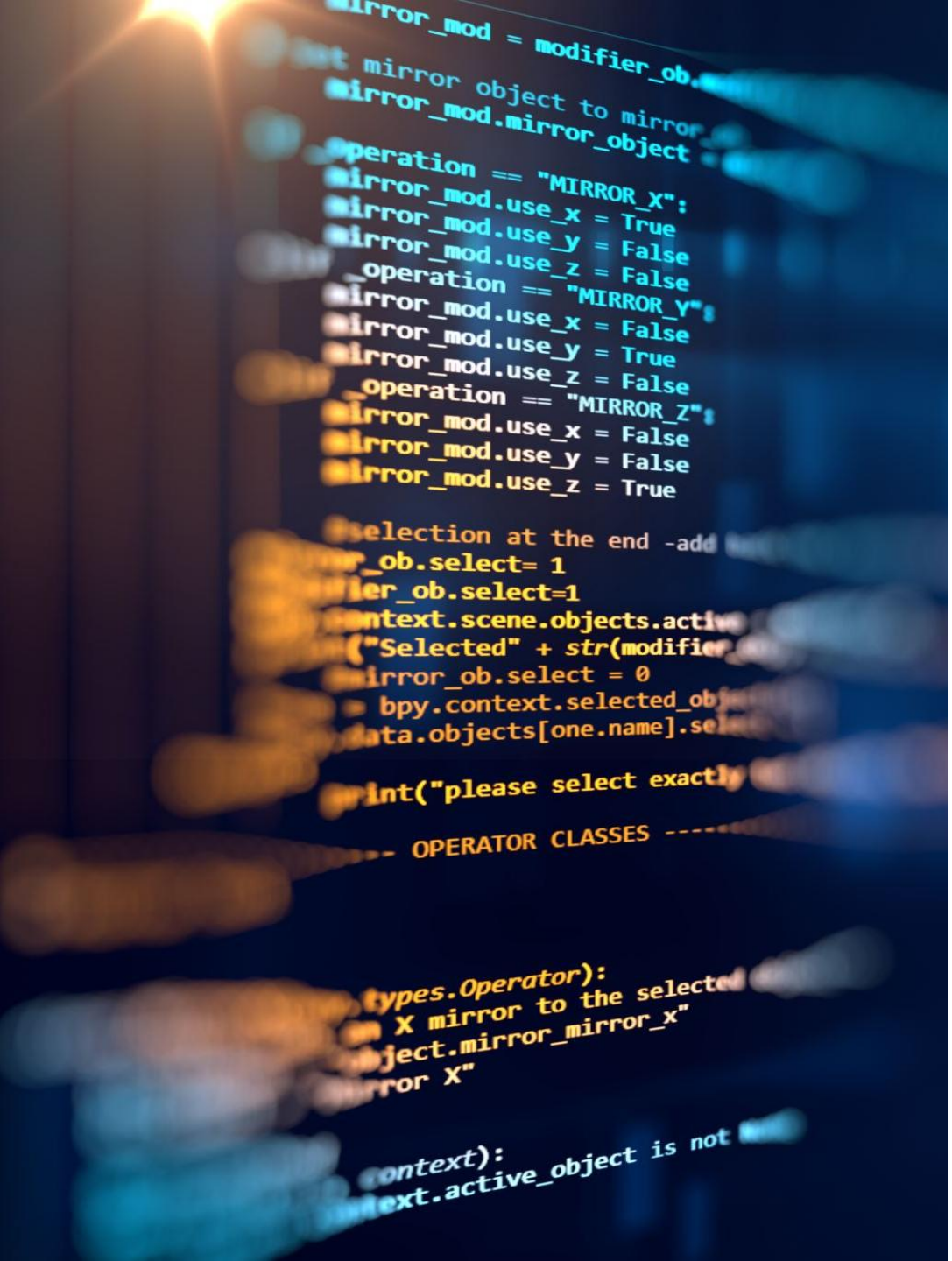
The f before the quotes:

- Means "format this **string**"
- Let’s you put variables inside {curly braces}
- The variable's value appears in the text!

Challenge 1: Create Your Character

Your code should:

- Display a title for your adventure
- Print an opening scene (3+ lines)
- Ask for: name, character class, hometown
- Display a personalized welcome message



Learning Intention:

Making Choices Using if/elif/else to Branch Your Story

Success Criteria:

- I can use if statements
- I can use elif for multiple options
- I can use else for defaults
- Different choices lead to different outcome

Comparing Values

- == means "is equal to" (NOT =)
- != means "is not equal to“
- > greater than
- < less than

If Statements - The Basics

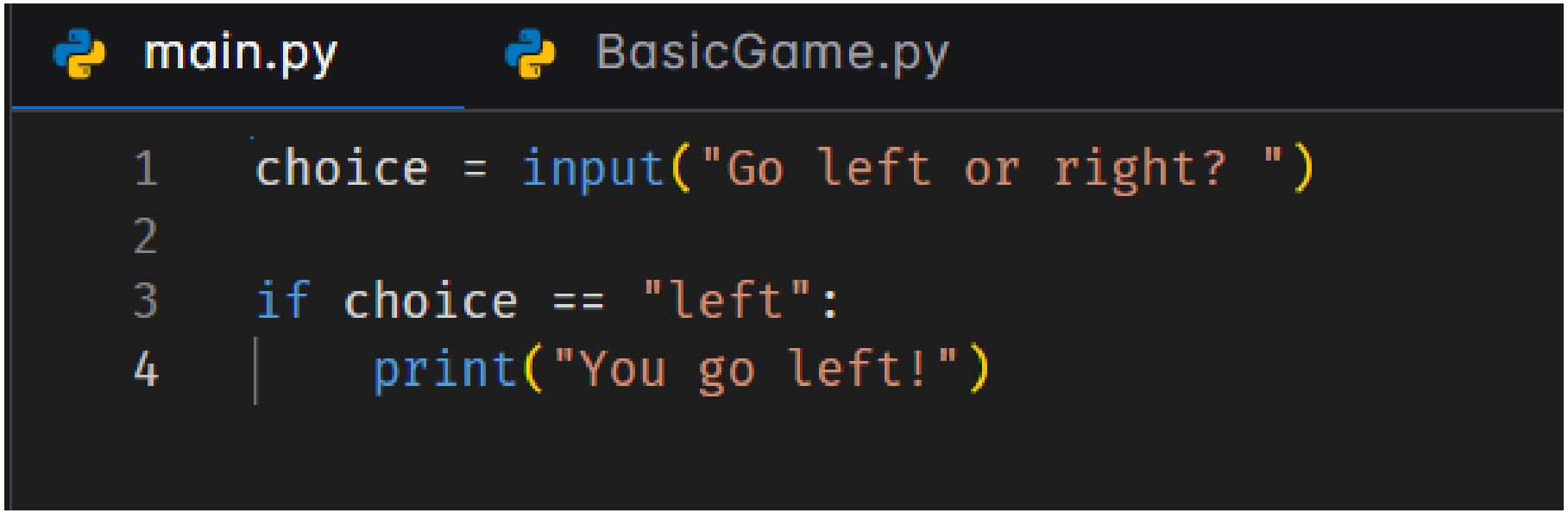
Key point: Code inside the if MUST be indented!

main.py BasicGame.py

```
1   if condition:
2       # Code here runs if condition is True
3       print("This happens!")
```

If Statements - The Basics

Let's say you want to allow players to pick a direction or option...



If Statements - The Basics

What if we want the player to be able to go left and right?

main.py BasicGame.py

```
1   choice = input("Go left or right? ")
2
3   if choice == "left":
4       print("You go left!")
5   elif choice == "right":
6       print("You turn right!");
7
```

If Statements - The Basics

What if we want multiple choices plus a way to make sure the player knows they made a mistake?

main.py BasicGame.py

```
1   choice = input("Choose 1, 2, or 3: ")
2
3   if choice == "1":
4       print("You chose option 1!")
5   elif choice == "2":
6       print("You chose option 2!")
7   elif choice == "3":
8       print("You chose option 3!")
9   else:
10      print("That's not a valid choice!")
```

else catches everything not caught by if/elif

- Useful for invalid inputs
- Always comes last
- No condition needed

UI/U

Make
playe
respo
code

```
 7
 8   if choice == "1":
 9       print("You chose option 1!")
10   elif choice == "2":
11       print("You chose option 2!")
12   elif choice == "3":
13       print("You chose option 3!")
14   else:
15       print("That's not a valid choice!")
```

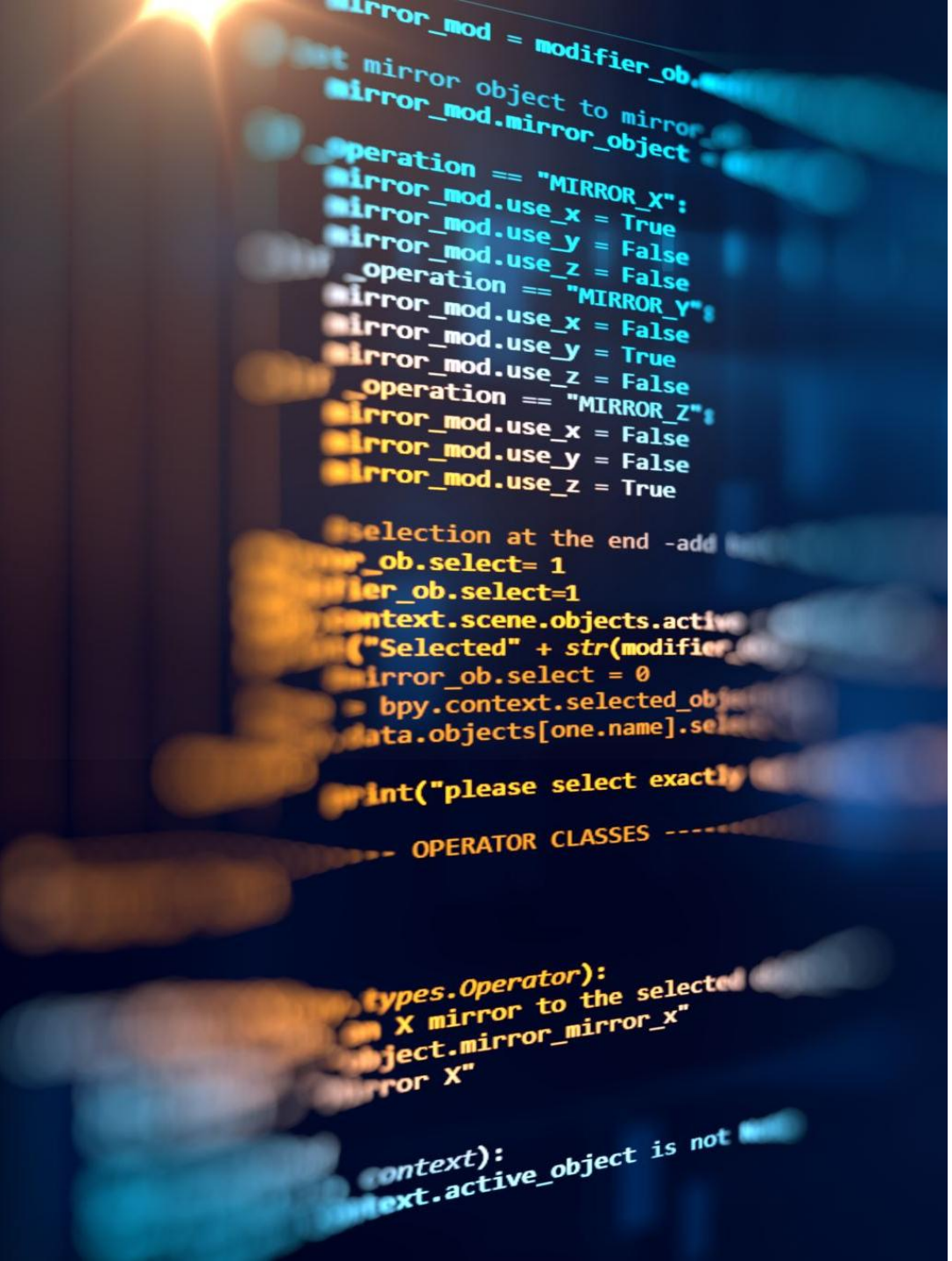
TERMINAL

You come to a fork in the road

Challenge 2: The first choice

Create a scenario with:

- A clear situation
- 2-3 numbered choices
- Different outcomes for each choice
- 1-2 sentences per outcome



Learning Intention:

Keeping Score - Tracking Stats Using Variables That Change

Success Criteria:

- I can create numeric variables
- I can change variable values
- I can display current stats
- Different choices change stats differently

Why Track Stats?

Games need to remember:

- How much health you have
- How much gold you've collected
- Your experience points
- Your reputation
- Inventory items

Variables can do all of this!

Creating Numeric Variables

main.py BasicGame.py

```
1    health = 100
2    experience = 0
3    gold = 50
4    reputation = 0
```

Notice: No quotes! These are numbers, not text. Only Strings (text) needs quotes.

Displaying Stats

main.py BasicGame.py

```python
health = 100
experience = 0
gold = 50
reputation = 0

print("=" * 40)
print("CHARACTER STATUS")
print("=" * 40)
print(f"Health: {health}")
print(f"Experience: {experience}")
print(f"Gold: {gold}")
```

TERMINAL

```
========================================
CHARACTER STATUS
========================================
Health: 100
Experience: 0
Gold: 50
```

Changing Values

What happens if our player drinks a health potion or takes damage? How can we reflect that in our stats?

main.py BasicGame.py

```python
health = 100
experience = 0
gold = 50
reputation = 0

print("=" * 40)
print("CHARACTER STATUS")
print("=" * 40)
print(f"Health: {health}")
print(f"Experience: {experience}")
print(f"Gold: {gold}")
print(" " * 40)
print("AH! You take an arrow to the knee, lose 20HP");
health = health - 20  # Take damage
print(f"Health is now: {health}")
```

TERMINAL

```
========================================
CHARACTER STATUS
========================================
Health: 100
Experience: 0
Gold: 50

AH! You take an arrow to the knee, lose 20HP
Health is now: 80
```

Changing variables with shorthand notation

Instead of health = health - 20

You can use shorthand...

```
health -= 20  # Subtract 20
health += 50  # Add 50
gold *= 2     # Multiply by 2
```

Both ways work! Use what makes sense to you.

Stat Changes Based on Choices

main.py BasicGame.py

```python
health = 100
experience = 0
gold = 50
reputation = 0

print("You encounter a troll with a club that does 20 damage but gives 50xp and may be carrying gold");
print(f"Your health is now: {health}")


choice = input("Will you Fight or flee? ")

if choice == "fight":
    health -= 30
    experience += 50
    gold += 100
    print("Victory! But you're wounded.")
    print(f"Your health is now {health}")
    print(f"Your experience is now {experience}")
    print(f"Your gold is now {gold}")
elif choice == "flee":
    health -= 5
    experience += 10
    print("You escape safely!")
```

TERMINAL

```
You encounter a troll with a club that does 20 damage but gives 50xp and may be carrying gold
Your health is now: 100
Will you Fight or flee? fight
Victory! But you're wounded.
Your health is now 70
Your experience is now 50
Your gold is now 150
```

Triggering messages to the player based on stats

main.py BasicGame.py

```
9
10  choice = input("Will you Fight or flee? ")
11
12  if choice == "fight":
13      health -= 30
14      experience += 50
15      gold += 100
16      print("Victory! But you're wounded.")
17      print(f"Your health is now {health}")
18      print(f"Your experience is now {experience}")
19      print(f"Your gold is now {gold}")
20  elif choice == "flee":
21      health -= 5
22      experience += 10
23      print("You escape safely!")
24
25  if health < 20:
26      print("⚠️  Warning: Low health!")
27
28  if gold >= 100:
29      print("💰 You're rich!")
```

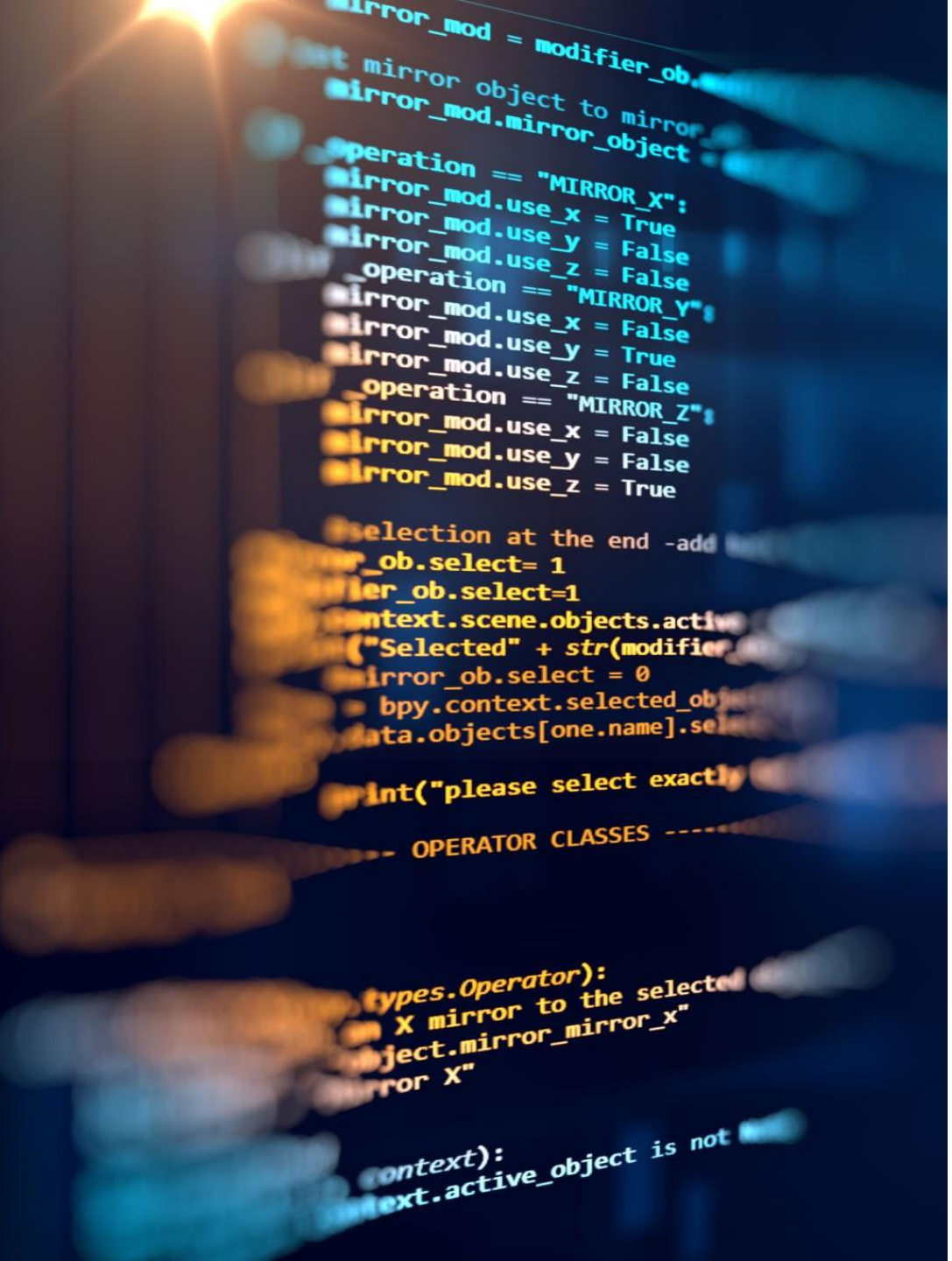
TERMINAL

```
You encounter a troll with a club that does 20 damage but gives 50xp and may be carrying gold
Your health is now: 100
Will you Fight or flee? fight
Victory! But you're wounded.
Your health is now 70
Your experience is now 50
Your gold is now 150
💰You're rich!
```

Challenge 3: The Encounter

Create code that:

- Sets up starting stats (3+)
- Presents an encounter
- Player makes a choice
- Stats change based on choice
- Shows before and after stats for both choices



Learning Intention:

TAKING CHANCES- **Random Events** Adding Chance and Risk

Success Criteria:

- I can import random
- I can use random.randint()
- I can create percentage chances
- Random outcomes affect the game

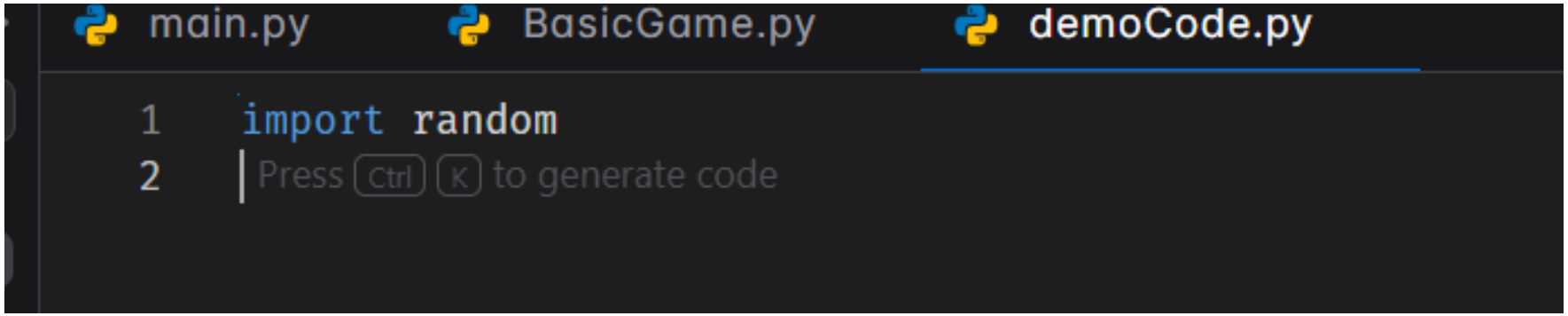
Why Randomness?

- Games are more exciting when:
- Outcomes aren't guaranteed
- There's risk and reward
- You can't predict everything
- Luck plays a role

Random = unpredictable!

The Random Module

- **Put this at the very TOP of your file!**
- This gives you access to random functions



Random Numbers

- random.randint(1, 6) gives a random number from 1 to 6
- Like rolling a 6-sided die!
- Could be 1, 2, 3, 4, 5, or 6

- How would you simulate a D20?

Using Random for Success/Failure

- 50% chance: rolls 4, 5, or 6 succeed
- Notice >=4

```
1    roll = random.randint(1, 6)
2
3    if roll >= 4:
4        print("Success!")
5    else:
6        print("Failure!")
```

Percentage Chances

Pattern:

- Generate number 1-100
- Check if ≤ your percentage

```
chance = random.randint(1, 100)

if chance <= 40:
    print("Success! (40% chance)")
else:
    print("Failure! (60% chance)")
```

Common Patterns

```python
import random
# 50/50 chance
if random.randint(1, 2) == 1:
    print("Heads!")
else:
    print("Tails!")

# 25% chance
if random.randint(1, 100) <= 25:
    print("Rare event!")
```

Random in Combat

- What is the code doing?

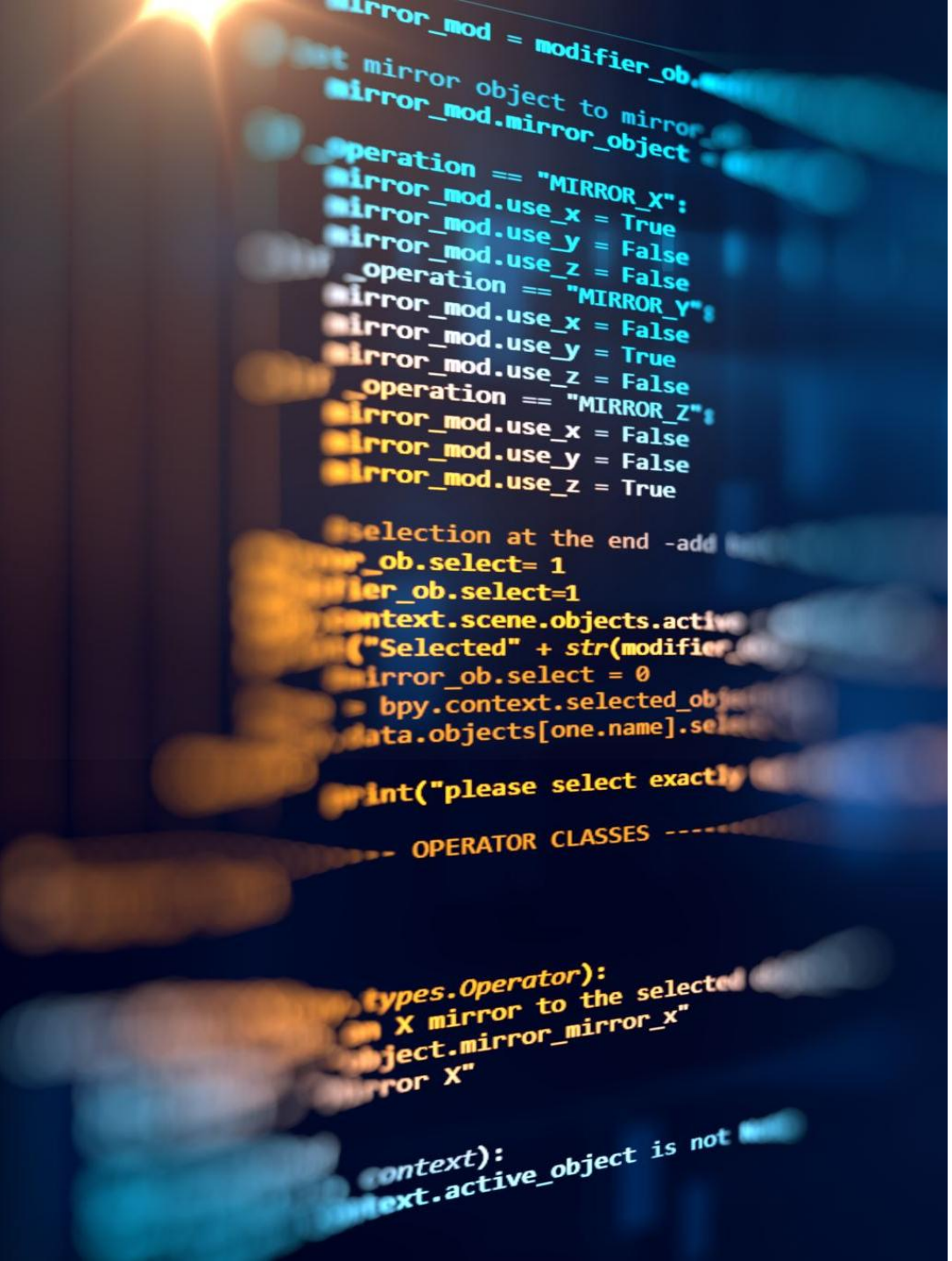
```python
import random
print("You attack the dragon!")
chance = random.randint(1, 100)

if chance <= 40:
    print("Hit! 50 damage!")
    boss_health -= 50
    xp += 100
else:
    print("Miss! The dragon counters!")
    health -= 30
```

Challenge 4: The Risky Decision

Create a risky situation with:

- Clear description of the risk
- A % chance of success (you choose!)
- random.randint() to determine outcome
- Different results for success/failure
- Stats change based on outcome



Learning Intention:

LEVELING UP **- Complex Interactions** Combining Everything We've Learned

Success Criteria:

- I can check stats before allowing actions
- I can use and/or for complex conditions
- I can create stat-based chances
- I can combine all concepts together

What We Know

- print() and input()
- Variables (text and numbers)
- if/elif/else
- Changing stats
- Random events

Today: Put it all together!

Checking Before Allowing

- Check stats BEFORE letting players do things!

main.py BasicGame.py demoCode.py

```
1   if health < 20:
2       print("You're too weak to fight!")
3   elif gold >= 100:
4       print("You can afford the potion!")
5   else:
6       print("Not enough resources...")
```

Multiple Conditions

- **and** -> both must be true
- **or** -> at least one must be true

main.py BasicGame.py demoCode.py

```
1   if health > 50 and gold >= 100:
2       print("You can afford expensive healing!")
3
4   if level >= 5 or has_special_key:
5       print("You can enter the chamber!")
```

Stat-Based Chances

- Higher stats = better chances!

main.py BasicGame.py demoCode.py

```
strength = 15

success_chance = strength * 3
# 15 strength = 45% chance

roll = random.randint(1, 100)
if roll <= success_chance:
    print("Your strength helps you succeed!")
```

Complex Example

- min(health + 40, 100)
- heals 40 but caps total health at 100

main.py BasicGame.py demoCode.py

```python
gold = 60
health = 70

if gold >= 50:
    gold -= 50
    health = min(health + 40, 100)
    print(f"Potion bought and used! Health is now {health}")
elif gold < 50:
    print("Not enough gold!")
```

TERMINAL

```
Potion bought and used! Health is now 100
```

The Shop Pattern

main.py BasicGame.py demoCode.py

```python
print("1. Health Potion (50 gold)")
print("2. Strength Training (100 gold)")
choice = input("Buy what? ")

if choice == "1" and gold >= 50:
    gold -= 50
    health += 40
elif choice == "2" and gold >= 100:
    gold -= 100
    strength += 5
else:
    print("Can't afford or invalid choice!")
```

Level-Gating Content

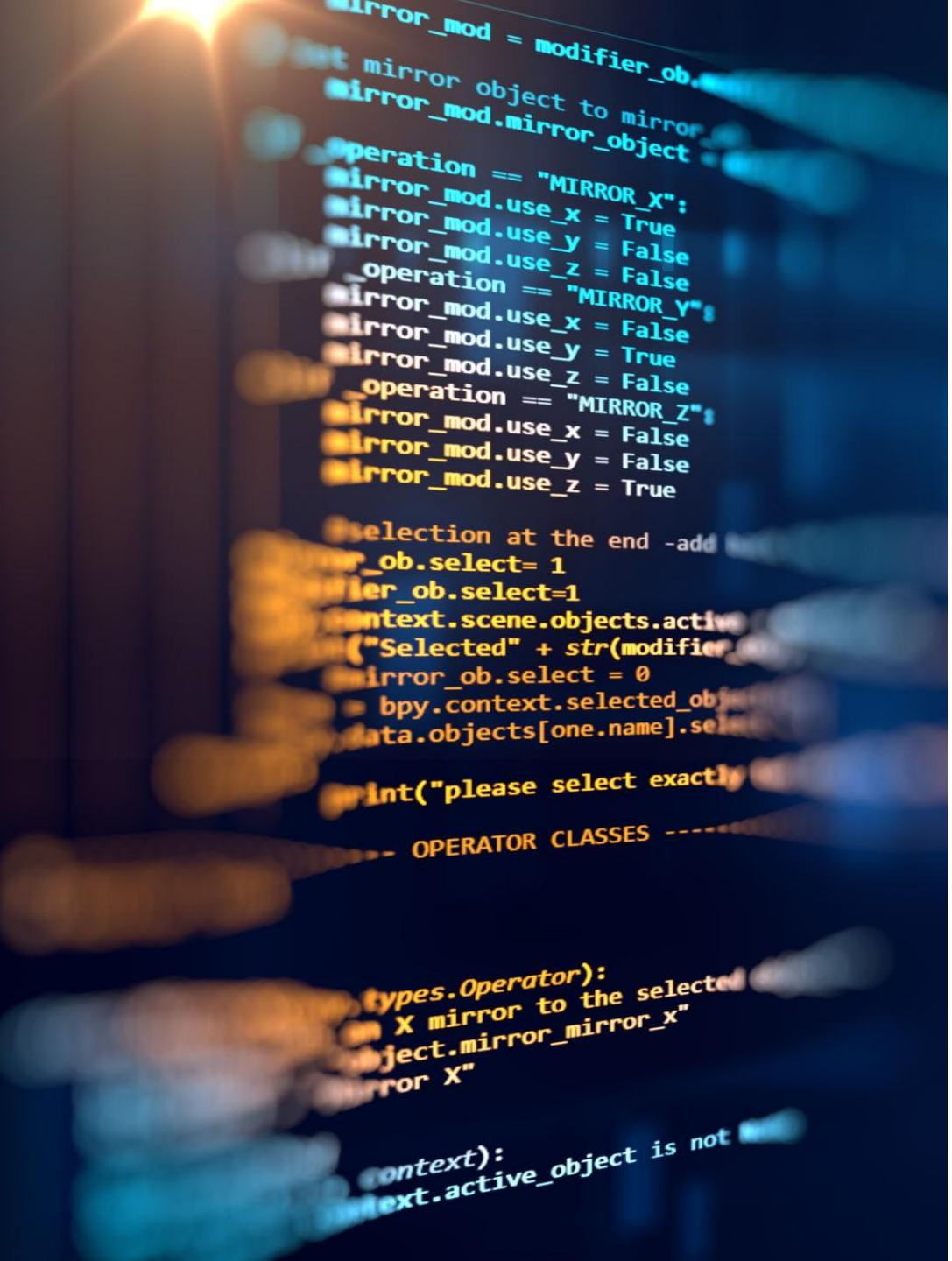
main.py × BasicGame.py demoCode.py

```
1   if level < 3:
2       print("You must be level 3 to enter!")
3       print("Come back when you're stronger.")
4   else:
5       print("Welcome to the advanced area!")
6       # More challenging content here
```

Challenge 5: The Boss Fight

Create a boss encounter with:

- Player AND boss stats
- 2-3 combat options
- Requirements for special moves
- Stat-based success chances
- Multiple possible outcomes
- Bonus: Add a shop before the boss fight (like in Hades!)



Learning Intention:

Character Inventory Systems: From Lists to Libraries

Success Criteria:

- I can use lists to build a basic inventory system
- I can use libraries to build more robust and varied inventory systems

What is an Inventory System?

A way to store and manage items your character carries

Items

Storage

Actions

Simple Approach: Lists

```
# Create an inventory
 inventory = []


# Add items
 inventory.append("sword")
 inventory.append("shield")
 inventory.append("potion")


# Check inventory

print(inventory)

# Output: ['sword', 'shield',
'potion']
```

- Simple and easy to understand
- Good for basic item tracking

Lists in Action

```
# Remove an item
 inventory.remove("potion")
# Check if item exists
if "sword" in inventory:
print("You have a sword!")

# Count items
item_count = len(inventory)
print(f"You have{item_count} items")

# Display all items

for item in inventory:

print(f"-{item}")
```

Advanced: Dictionary Library

```
# Create inventory with item details
 inventory = {

"sword": {"damage": 10, "type": "weapon"},

"shield": {"defense": 8, "type": "armor"},

"potion": {"healing": 20, "type": "consumable"}
 }



# Access item properties

print(inventory["sword"]["damage"])

# Output: 10
```

Using a dictionary will allow us to

- Store multiple properties per item
- Make more complex inventory systems

Dictionary in Action

```
# Add new item
 inventory[
"bow"] = {"damage": 8, "type": "weapon"}
# Remove item
del inventory["potion"]
# Check if item exists
if "sword" in inventory:
print("Sword equipped!")

# Loop through all items
for item, stats in inventory.items():

print(f"{item}:{stats}")
```

When to Use Each?

Lists

- Simple item names
- No extra details needed
- Quick and easy
- Great for beginners

```
["sword", "shield"]
```

Dictionaries

- Item properties
- Stats and details
- More organized
- Better for RPGs

```
{"sword": {"dmg": 10}}
```

Your Turn!

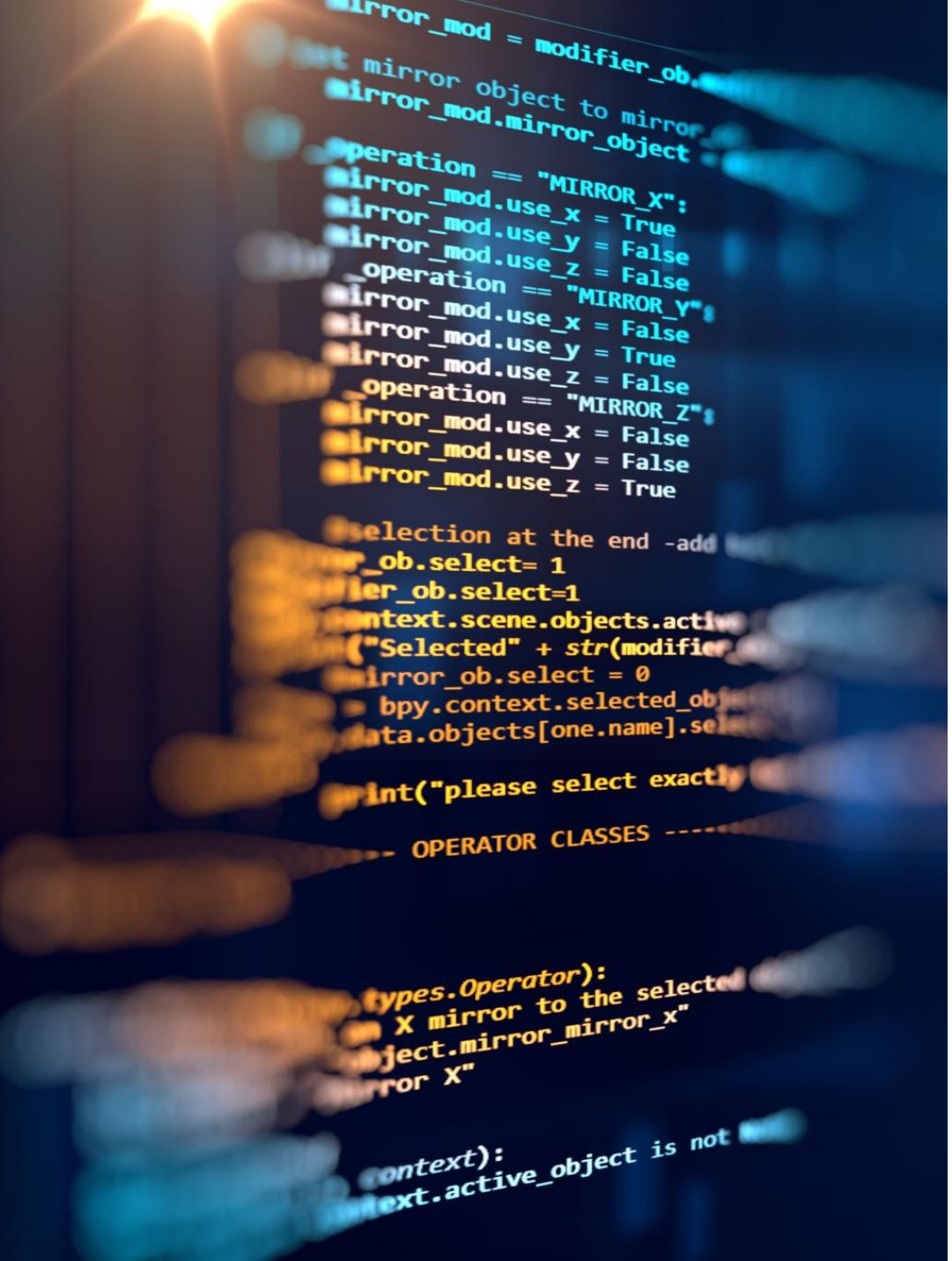
Practice Challenge

Create an inventory system for a game character with at least 5 items

Choose your approach:

- Simple: Use a list
- Advanced: Use a dictionary with item stats

💡 **Bonus: Add functions to add and remove items!**



Learning Intention:

LEVELING UP **- Object Oriented Programming** Creating editable characters

Success Criteria:

- I can use classes in my code
- I can create, call and modify objects

What Are Objects?

Think about real-world objects...

Car

Has: color, speed, fuel

Does: accelerate, brake

Phone

Has: battery, apps

Does: call, message

Objects have PROPERTIES and can DO things!

Your First Class

A **class** is a blueprint for creating objects

```
class Dog:
    def __init__(self, name, age):
        self.name = name
        self.age = age

    def bark(self):
        print(f"{self.name} says Woof!")
```

__init__ sets up the object

self refers to this object

Attributes vs Methods

📦 Attributes

What an object **HAS**

- Properties of the object
- Data it stores

```
dog.name
dog.age
```

Methods

What an object can **DO**

- Actions it can perform
- Functions inside the class

```
dog.bark()
dog.sit()
```

Creating Multiple Objects

One class can create **many objects**!

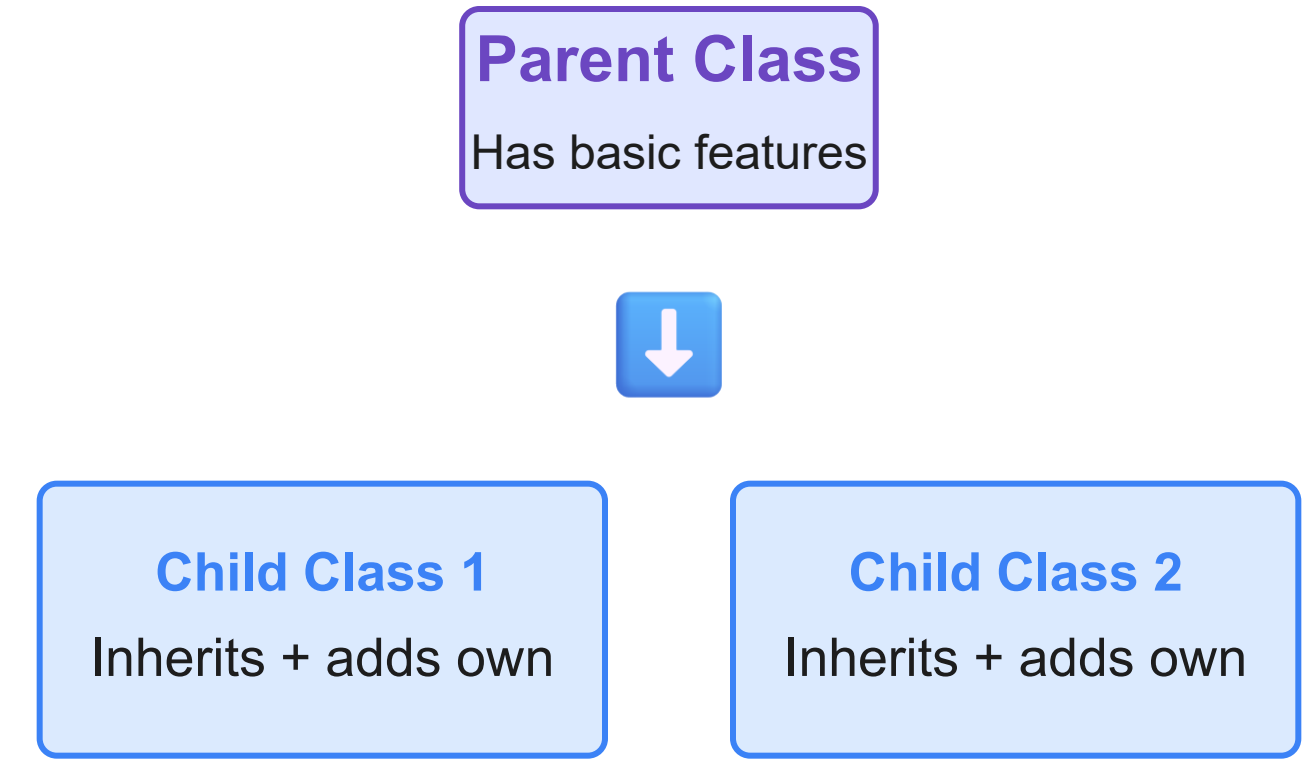
```
# Create different dogs
buddy = Dog("Buddy", 3)
max = Dog("Max", 5)
bella = Dog("Bella", 2)

# Each dog is unique!
buddy.bark() # Buddy says Woof!
max.bark() # Max says Woof!
```

Key Idea: Same blueprint, different objects!

What is Inheritance?

Create **new classes** based on existing ones!



Let's Build Game Characters!

Use OOP to create different character types

Warrior

- High health
- Strong attacks
- Special: Power Strike

Mage

- Lower health
- Magic attacks
- Special: Cast Spell

Archer

- Medium health
- Quick attacks
- Special: Multi-shot

⚔️ Warrior Class

```
class Warrior(Character):
    def __init__(self, name):
        super().__init__(name, health=150, strength=20)
        self.armor = 10

    def special_attack(self, target):
        print(f"{self.name} uses POWER STRIKE!")
        target.take_damage(self.strength * 2)
```

Inherits from Character class

super() calls parent's __init__

Special Attack: Double damage! 💥

🔮 Mage Class

```
class Mage(Character):
    def __init__(self, name):
        super().__init__(name, health=80, strength=10)
        self.mana = 100

    def cast_spell(self, target):
        if self.mana >= 20:
            print(f"{self.name} casts FIREBALL!")
            target.take_damage(30)
            self.mana -= 20
```

Lower health than Warrior

Mana resource for spells

Magic Attack: Costs mana to cast! ✨

⚔️ Let's Battle! 🔮

```
# Create characters
knight = Warrior("Sir Lancelot")
wizard = Mage("Merlin")

# Battle!
knight.attack(wizard)
wizard.cast_spell(knight)

knight.special_attack(wizard) # POWER STRIKE!
```

✅ What We Learned

- Classes create objects
- Objects have attributes & methods
- Inheritance shares code

🎮 Your Turn!

Design your own character classes!

main.py bosfight.py lists.py libraries der

```python
class Dog:
    def __init__(self,name,age):
        self.name=name
        self.age=age

    def bark(self):
        print(f"{self.name} says woof!")

scooby = Dog("scooby",67)
scooby.bark()

class Big_Dog(Dog):
    def __init__(self,name,age,long_tail):
        super().__init__(name,age)
        self.long_tail = long_tail

    def bite(self):
        print(f"{self.name} bites!")

big_scooby = Big_Dog("scooby",67,True)
big_scooby.bite()
print(f"Long tail?: {big_scooby.long_tail}")
```

TERMINAL

```
scooby says woof!
scooby bites!
Long tail?: True


** Process exited - Return Code: 0 **
```