

geoffreyangus.github.io/CS106R/

Week 2

CS106R

Sabri **Eyuboglu** & Geoffrey **Angus**

PyBot

🍊 Collected: 0







?



Loops & Conditional Statements

But first... a **review**.

Review

```
1
2
3 def main():
4     ### Start Your Code ###
5     pass # Delete this line when you begin
6
7
8
9     ### End Your Code ###
10
11
12
13 ### Do not edit the code below this line ###
14 if __name__ == "__main__":
15     main()
```

move()

turn_right()

pick_fruit()

PyBot

🍊 Collected: 0



The “def” keyword

The function **name** + “()” + “:”

```
def this_is_a_function():
    """
    This is an example function for the class notes.
    """
    if not front_is_blocked():
        move()
        turn_right()
        turn_right()
        move()
        move()
```

The function **body**

8 lines :

```
def main():
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    turn_right()
    turn_right()
    turn_right()
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    turn_right()
    turn_right()
    turn_right()
    if __name__ == '__main__':
        main()
```

```
def turn_left():
    turn_right()
    turn_right()
    turn_right()

def pick_and_move():
    pick_fruit()
    move()

def pick_fruit_across():
    pick_and_move()
    pick_and_move()
    pick_and_move()
    pick_and_move()

def main():
    pick_fruit_across()
    turn_left()
    pick_fruit_across()
    turn_left()

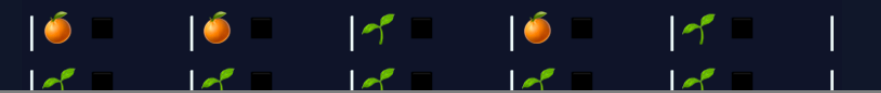
if __name__ == '__main__':
    main()
```

1 line :D

Review

PyBot

Collected: 0



```
1
2
3 def main():
4     ### Start Your Code ###
5     pass # Delete this line when you begin
6
7
8
9     ### End Your Code ###
10
11
12
13 ### Do not edit the code below this line ###
14 if __name__ == "__main__":
15     main()
```

```
corn_right()
main()
if __name__ == '__main__':
    main()
```

Review

PyBot

🍊 Collected: 0



```
corn_right()
main()
if __name__ == '__main__':
    main()
```

Review

PyBot

Collected: 0



`move()`

`turn_right()`

`pick_fruit()`

```
turn_right()
if __name__ == '__main__':
    main()
```

Review

PyBot

Collected: 0



The “**def**” keyword

The function **name** + “**()**” + “**:**”

```
def this_is_a_function():  
    """  
    This is an example function for the class notes.  
    """  
    if not front_is_blocked():  
        move()  
    turn_right()  
    turn_right()  
    move()  
    move()
```

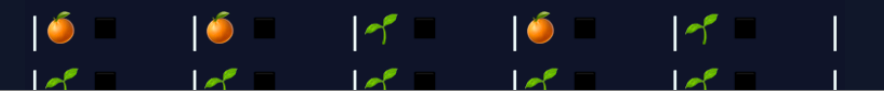
The function **body**

```
turn_right()  
main()  
if __name__ == '__main__':  
    main()
```

Review

PyBot

🍊 Collected:0



8 lines :(

```
def main():
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    turn_right()
    turn_right()
    turn_right()
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    turn_right()
    turn_right()
    turn_right()

if __name__ == '__main__':
    main()
```

```
def turn_left():
    turn_right()
    turn_right()
    turn_right()
```

```
def pick_and_move():
    pick_fruit()
    move()
```

```
def pick_fruit_across():
    pick_and_move()
    pick_and_move()
    pick_and_move()
    pick_and_move()
```

```
def main():
    pick_fruit_across()
    turn_left()
    pick_fruit_across()
    turn_left()
```

```
if __name__ == '__main__':
    main()
```

1 line :D

Review

```
1
2
3 def main():
4     ### Start Your Code ###
5     pass # Delete this line when you begin
6
7
8
9     ### End Your Code ###
10
11
12
13 ### Do not edit the code below this line ###
14 if __name__ == "__main__":
15     main()
```

move()

turn_right()

pick_fruit()

PyBot

🍊 Collected: 0



The “def” keyword

The function **name** + “()” + “:”

```
def this_is_a_function():
    """
    This is an example function for the class notes.
    """
    if not front_is_blocked():
        move()
        turn_right()
        turn_right()
        move()
        move()
```

The function **body**

8 lines :

```
def main():
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    turn_right()
    turn_right()
    turn_right()
    pick_fruit()
    move()
    pick_fruit()
    move()
    pick_fruit()
    move()
    turn_right()
    turn_right()
    turn_right()
    if __name__ == '__main__':
        main()
```

```
def turn_left():
    turn_right()
    turn_right()
    turn_right()

def pick_and_move():
    pick_fruit()
    move()

def pick_fruit_across():
    pick_and_move()
    pick_and_move()
    pick_and_move()
    pick_and_move()

def main():
    pick_fruit_across()
    turn_left()
    pick_fruit_across()
    turn_left()

if __name__ == '__main__':
    main()
```

1 line :D

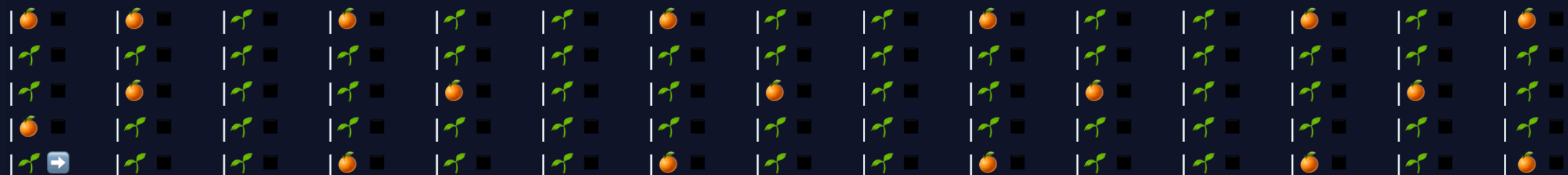
PyBot

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🍊 ■	🌱 ■	🌱 ■	🌱 ■	🌱 ■	
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PyBot

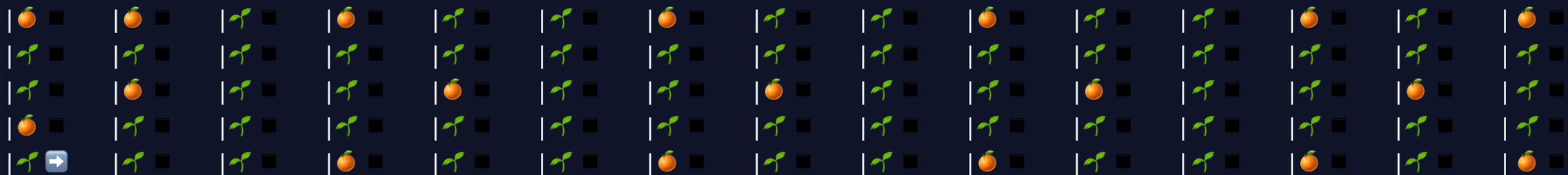
🍊 Collected:0



????

PyBot

🍊 Collected:0



move ()	move ()	move ()	move
move ()	move ()	move ()	move
move ()	move ()	move ()	move
move ()	move ()	move ()	move
move ()	move ()	move ()	move
move ()	move ()	move ()	move
move ()	move ()	move ()	move

Or...

For Loops

```
def move_across_99():  
    for i in range(99):  
        move()
```

Function Structure

```
def move_across_99():  
    for i in range(99):  
        move()
```

is the same thing as...

[illegible]

99 times!

Function Structure

Syntax = Syntaxe

```
for i in range(num_iterations):  
    action_function()  
    action_function()
```

Function Structure

Syntax

```
for i in range(num_iterations):  
    action_function()  
    action_function()
```


Function Structure

Syntax

```
for i in range(num_iterations):  
    action_function()  
    action_function()
```

Function Structure

Syntax

```
for i in range(num_iterations):  
    action_function()  
    action_function()
```

Function Structure

Syntax

```
for i in range(num_iterations):  
    action_function()  
    action_function()
```

Function Structure

Syntax

```
for i in range(num_iterations):  
    action_function()  
    action_function()
```

Function Structure

Syntax

```
for i in range(num_iterations):  
    → action_function()  
       action_function()
```

Example: Far Away Fruit

`if` Statements

Introducing **GeoffBot...**

GeoffBot Action Functions

`go_to_store()`

`buy_coca()`

`buy_guarana()`

`buy_sprite()`

If Statements

"GeoffBot, go to the store.

If they have Guarana, buy some."

If Statements

"GeoffBot, go to the store.

If they have Guarana, buy some."

```
go_to_store()
```

```
buy_guarana()
```

If Statements

"GeoffBot, go to the store.

If they have Guarana, buy some."



GeoffBot Conditional Functions

`has_coca()`

`has_sprite()`

`has_guarana()`

If Statements

"GeoffBot, go to the store.

If they have Guarana, buy some."



If Statements

"GeoffBot, go to the store.

If they have Guarana, buy some."

```
go_to_store()
```

```
if has_guarana() :
```

```
    buy_guarana()
```

If Statements

"GeoffBot, go to the store.

If they have Guarana, buy some."

```
go_to_store()
```

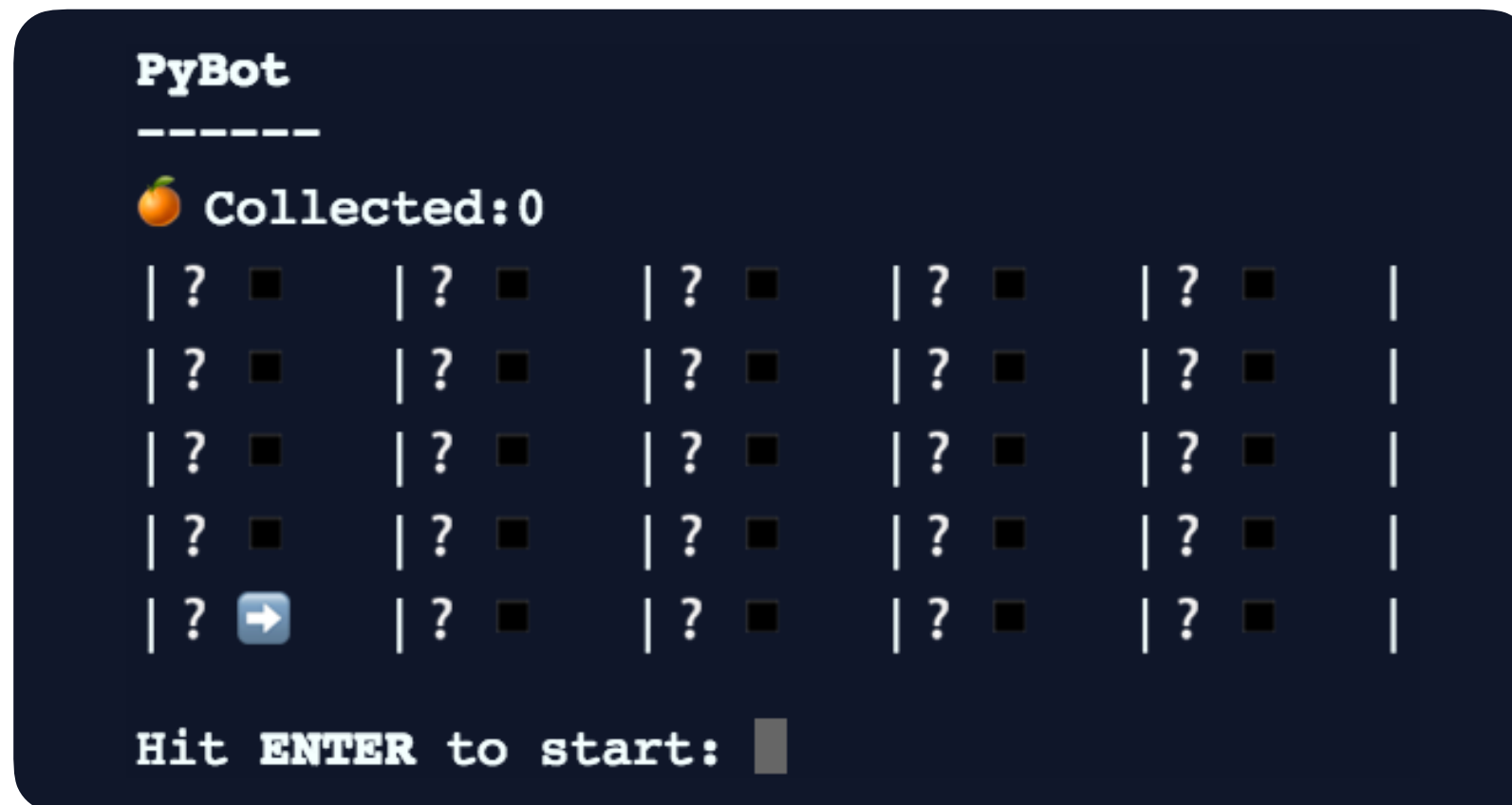
```
if has_guarana() :
```

```
    buy_guarana()
```


If Statements



If Statements



New PyBot Function

`has_fruit()`

Returns **True** if PyBot's current cell has an orange.

PyBot

🍊 Collected:0

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FALSE

PyBot

🍊 Collected:0

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🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🍊 ➡	🌱	🌱	🌱	

TRUE

New PyBot Function

```
if has_fruit():  
    pick_fruit()
```

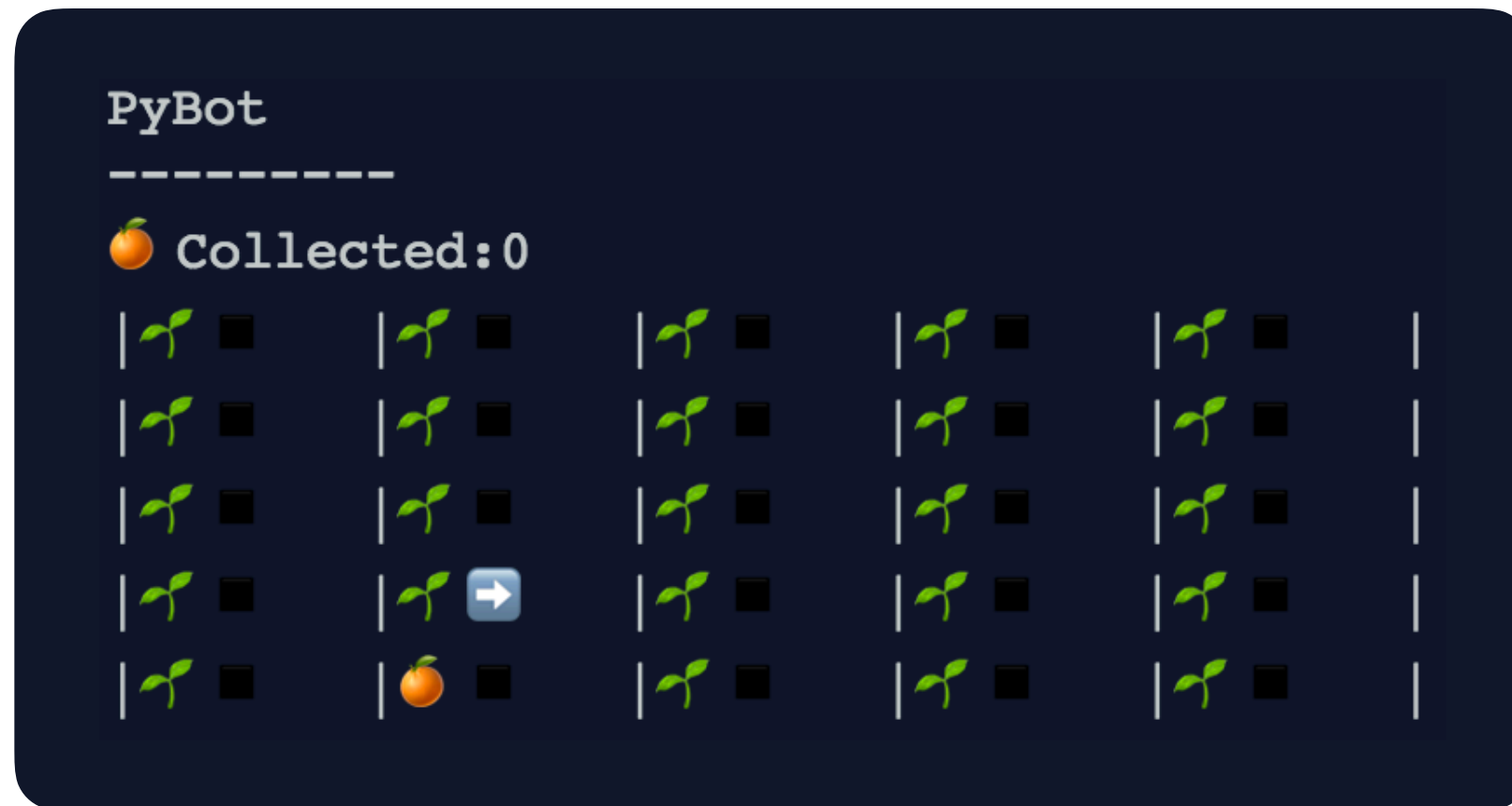
New PyBot Function



```
True  
if has_fruit():  
    pick_fruit()
```



New PyBot Function

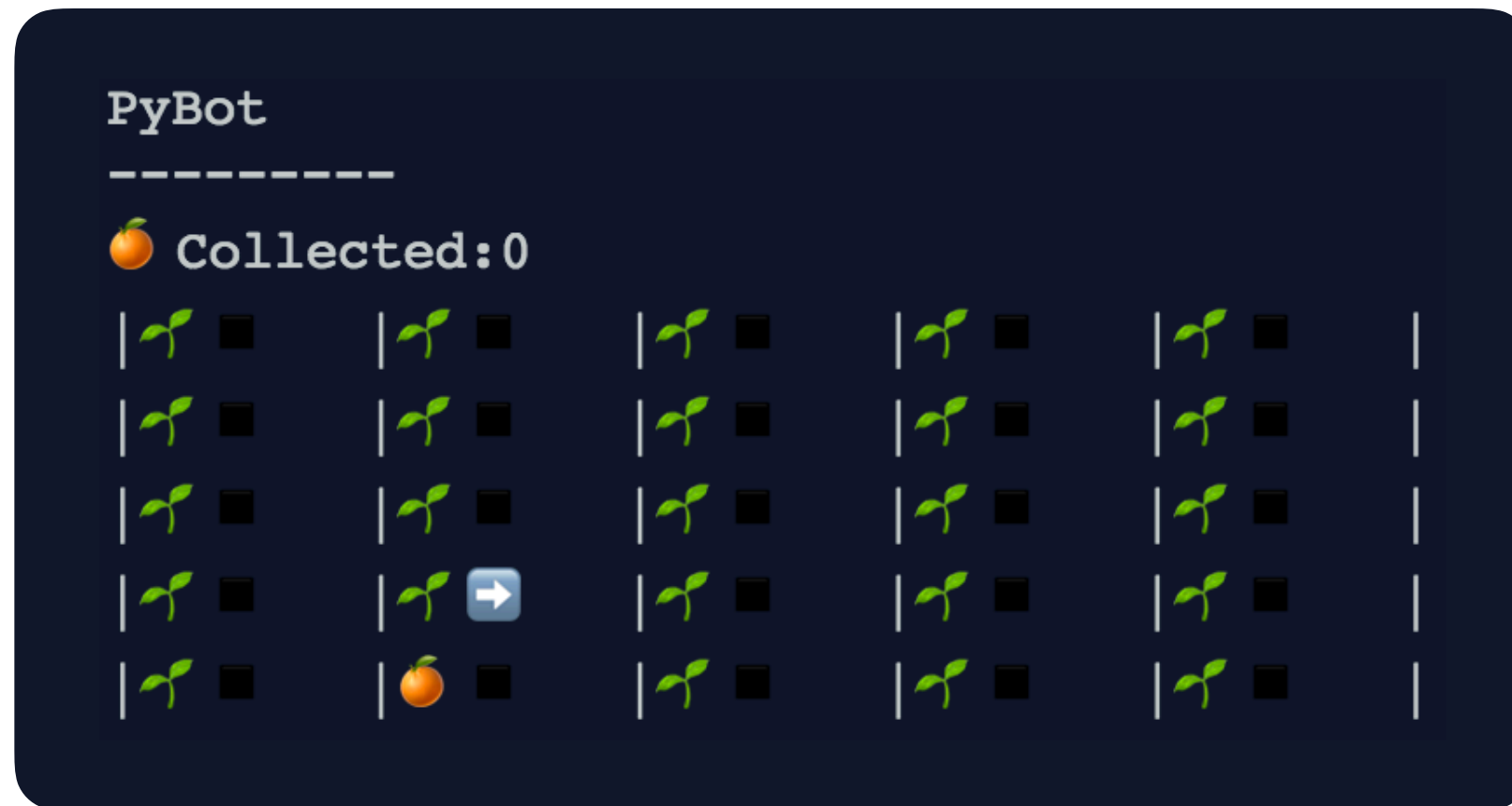


False

```
if has_fruit():  
    pick_fruit()
```

A large red 'X' is drawn over the code snippet, indicating it is incorrect.

New PyBot Function



False

```
if has_fruit():  
    pick_fruit()
```

A large red 'X' is drawn over the code, indicating it is incorrect.

If Statements

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...
```


If Statements

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...
```

If Statements

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...
```

If Statements

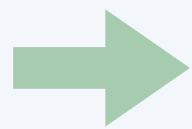
Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...
```

If Statements

Syntax

```
if condition_function():
```



```
    action_function()  
    action_function()  
    ...
```

Example: Safe Pick

Today's Exercises

Big Board

Square Dance

Rogue Fruit

Face North

Board's Edge

Two Rows

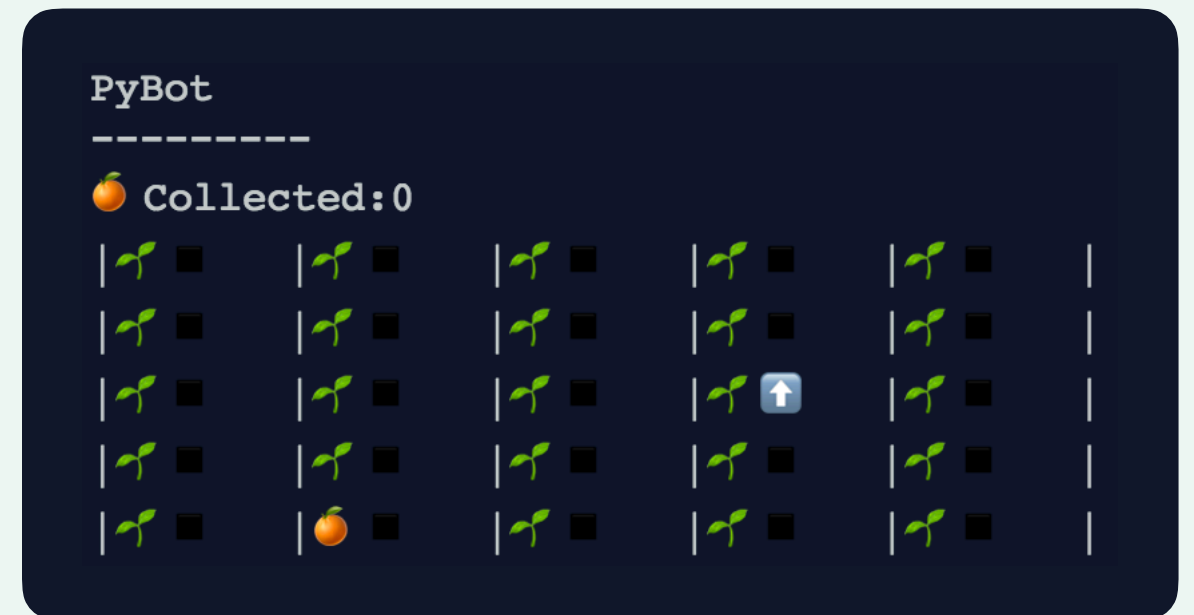
Conditional PyBot Functions

`is_facing_north()`

Returns **True** if PyBot is facing north.



FALSE



TRUE

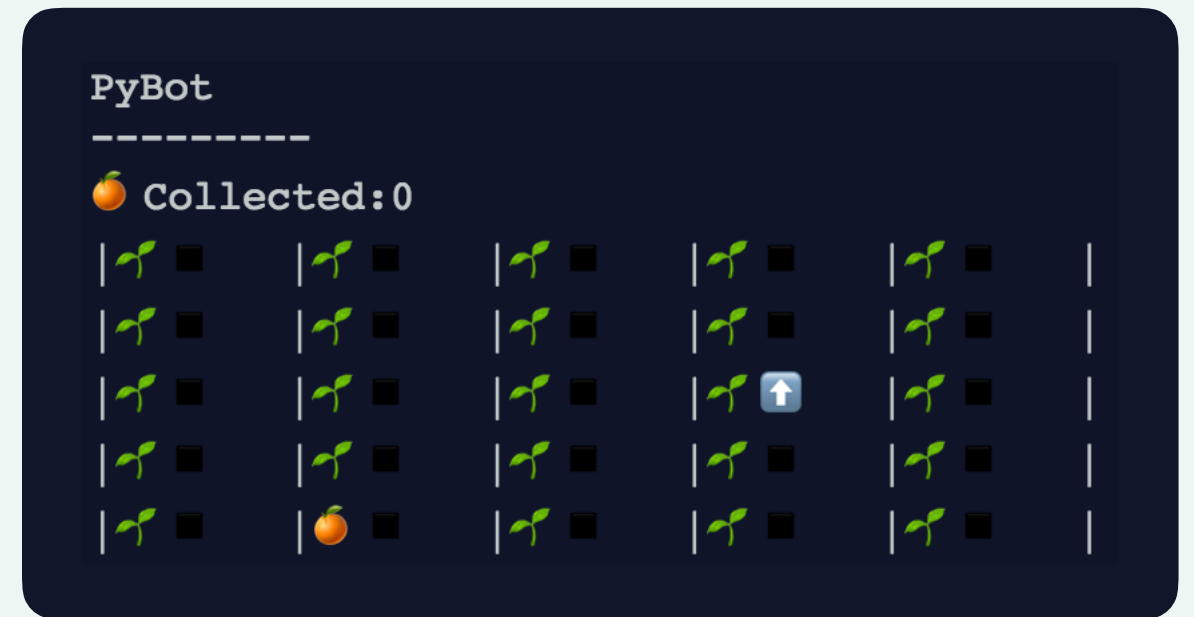
Conditional PyBot Functions

`is_facing_north()`

Returns **True** if PyBot is facing north.



FALSE



TRUE

`is_facing_east()`

`is_facing_south()`

`is_facing_west()`

else and elif

(“else if”)

Else and Elif Statements

Let's bring back GeoffBot...

Else and Elif Statements

"GeoffBot, go to the store.
If they have Guarana, buy some.
Otherwise buy me some Coca-
Cole."

Else and Elif Statements

"GeoffBot, go to the store.

If they have Guarana, buy some.

Otherwise buy me some Coca-Cole."

```
go_to_store()
```

```
if has_guarana() :
```

```
    buy_guarana()
```

```
else:
```

```
    buy_coca()
```

Else and Elif Statements

"GeoffBot, go to the store.

If they have Guarana, buy some.

Otherwise, if they have Sprite,
buy me some. Otherwise buy
me some Coca-Cola."

Elif Statements

"GeoffBot, go to the store.

If they have Guarana, buy some. Otherwise buy me some Coca-Cole."

```
go_to_store()
```

```
if has_guarana() :
```

```
    buy_guarana()
```

```
elif has_sprite() :
```

```
    buy_sprite()
```

```
else:
```

```
    buy_coca()
```

Function Structure

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...  
elif condition_function():  
    action_function()  
    action_function()  
    ...  
else:  
    action_function()  
    action_function()  
    ...
```

Function Structure

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...  
elif condition_function():  
    action_function()  
    action_function()  
    ...  
else:  
    action_function()  
    action_function()  
    ...
```


Function Structure

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...  
elif condition_function():  
    action_function()  
    action_function()  
    ...  
else:  
    action_function()  
    action_function()  
    ...
```

Function Structure

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...  
elif condition_function():  
    action_function()  
    action_function()  
    ...  
else:  
    action_function()  
    action_function()  
    ...
```

Function Structure

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...  
elif condition_function():  
    action_function()  
    action_function()  
    ...  
else:  
    action_function()  
    action_function()  
    ...
```

Function Structure

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...  
elif condition_function():  
    action_function()  
    action_function()  
    ...  
else:  
    action_function()  
    action_function()  
    ...
```

Function Structure

Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...  
elif condition_function():  
    action_function()  
    action_function()  
    ...  
else:  
    action_function()  
    action_function()  
    ...
```

Function Structure

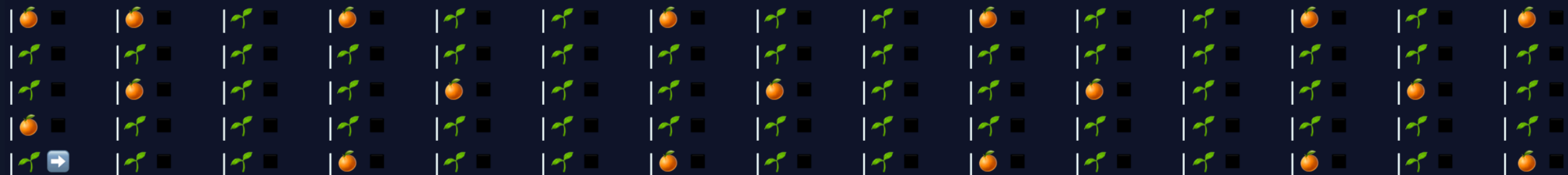
Syntax

```
if condition_function():  
    action_function()  
    action_function()  
    ...  
elif condition_function():  
    action_function()  
    action_function()  
    ...  
else:  
    action_function()  
    action_function()  
    ...
```

While Loops

PyBot

🍊 Collected:0



PyBot

🍊 Collected:0

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🌱 ■	🍊 ■	🌱 ■	🌱 ■	🍊 ■	🌱 ■	🌱 ■	🍊 ■	🌱 ■	
🍊 ■	🌱 ■	🌱 ■	🌱 ■	🌱 ■	🌱 ■	🌱 ■	🌱 ■	🌱 ■	
🌱 ➡	🌱 ■	🌱 ■	🍊 ■	🌱 ■	🌱 ■	🍊 ■	🌱 ■	🌱 ■	

Conditional PyBot Functions

`front_is_blocked()`

Returns **True** if PyBot is facing a wall.

PyBot

🍊 Collected:0

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🌱	🌱	🌱	🌱	🌱	
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🌱	🌱	🌱	🌱	🌱	
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FALSE

PyBot

🍊 Collected:0

🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🍊	🌱	🌱	🌱 ➡	

TRUE

```
def move_across_variable():  
    while not front_is_blocked():  
        move()
```

PyBot

🍊 Collected:0

🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
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🌱 ➡	🌱	🌱	🌱	🍊	

Hit **ENTER** to start: █

```
def move_across_variable():  
    while not front_is_blocked():  
        move()
```

PyBot

🍊 Collected:0

🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱 ➡	🌱	🌱	🌱	🍊	

Hit ENTER to start: █

```
def move_across_variable(): False
while not front_is_blocked():
    move()
```

PyBot

🍊 Collected:0

🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱 ➡	🌱	🌱	🌱	🍊	

Hit ENTER to start: █

```
def move_across_variable(): False
while not front_is_blocked():
    move()
```

```
def move_across_variable(): False
while not front_is_blocked():
    move()
```

is the same thing as...

```
def move_across_variable(): True
while not front_is_blocked():
    move()
```

PyBot

🍊 Collected:0

🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱 ➡	🌱	🌱	🌱	🍊	

Hit ENTER to start: █

```
def move_across_variable(): False
while not front_is_blocked():
    move()
```


PyBot

🍊 Collected:0

🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🍊 ➡	

Hit ENTER to start: █

```
def move_across_variable(): True
while not front_is_blocked():
    move()
```

PyBot

🍊 Collected:0

🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🌱	
🌱	🌱	🌱	🌱	🍊 ➡	

Hit ENTER to start: █

```
def move_across_variable(): False
while not front_is_blocked():
    move()
```

Example: Rogue Fruit 2

Today's Exercises

Big Board

Square Dance

Safe Pick

Safe Move

Find The End

Two Rows

Recap

For Loops = Repeat code a fixed number of times

If Statements = Allow your program to make decisions for you.

While Loops = Repeat code an unknown number of times.

