CoGrammar

SE PORTFOLIO SESSION 8

SKILLS FOR LIFE
SKILLS BOOTCAMPS

Department for Education

Software Engineering Lecture Housekeeping

- The use of disrespectful language is prohibited if asking a question. This is a supportive, learning environment for all – please engage accordingly! **(FBV: Mutual Respect.)**
- No question is 'silly' – **ask away!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. Moderators are going to be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Open Classes. You can submit these questions here: **Open Class Questions**

Software Engineering Lecture Housekeeping cont.

- For all **non-academic questions**, please submit a query: **www.hyperiondev.com/support**

- Report a **safeguarding** incident: **www.hyperiondev.com/safeguardreporting**

- We would love your **feedback** on lectures: **Feedback on Lectures**

Progression Criteria

✓ Criterion 1: Initial Requirements

- Complete 15 hours of Guided Learning Hours and the first four tasks within two weeks.

✓ Criterion 2: Mid-Course Progress

- Software Engineering: Finish 14 tasks by week 8.
- Data Science: Finish 13 tasks by week 8.

✓ Criterion 3: Post-Course Progress

- Complete all mandatory tasks by 24th March 2024.
- Record an Invitation to Interview within 4 weeks of course completion, or by 30th March 2024.
- Achieve 112 GLH by 24th March 2024.

✓ Criterion 4: Employability

- Record a Final Job Outcome within 12 weeks of graduation, or by 23rd September 2024.

Which of the following function names follow the correct convention?

A. myfunction()
B. My_Function()
C. myFunction()
D. my_function()

What keyword is used to define a function in Python?

A. func
B. define
C. function
D. def

Recap: Functions

Functions

- We can use python built-in functions or we can define our own functions with their own behaviours.

Parameter Variables

- We use parameter variables to receive input to use within the function.

Function Scope

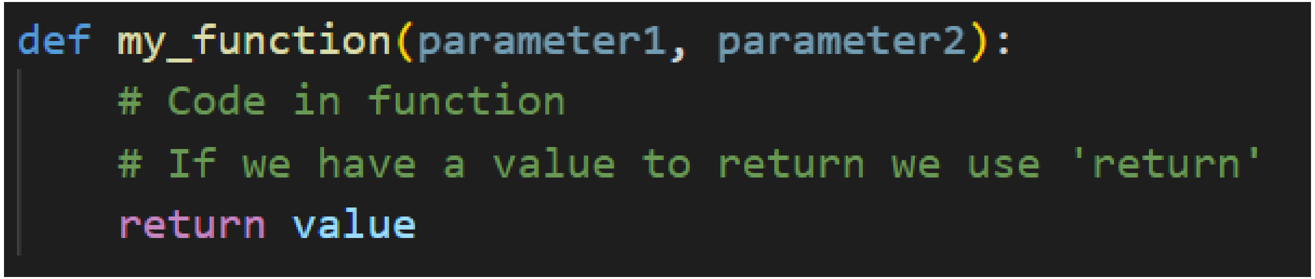
- Functions can use global variables but the main program can’t access variables within the function.

Return

- We can return data from a function using the ‘return’ keyword.

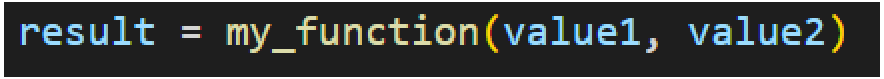
Recap: Functions

Defining a Function



```python
def my_function(parameter1, parameter2):
    # Code in function
    # If we have a value to return we use 'return'
    return value
```

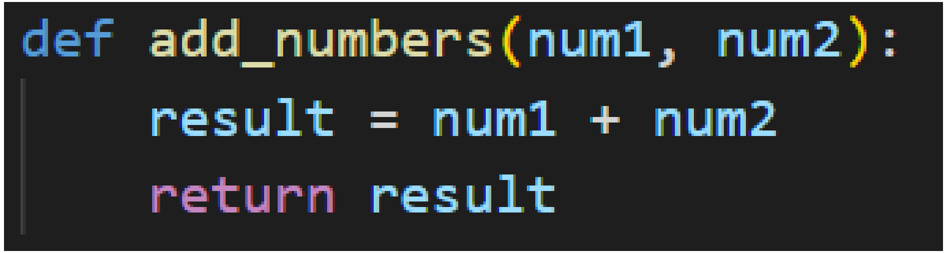
Calling a Function



```python
result = my_function(value1, value2)
```

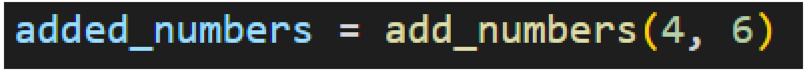
Recap: Functions

Defining a Function



```python
def add_numbers(num1, num2):
    result = num1 + num2
    return result
```

Calling a Function



```python
added_numbers = add_numbers(4, 6)
```

Vehicle Dashboard

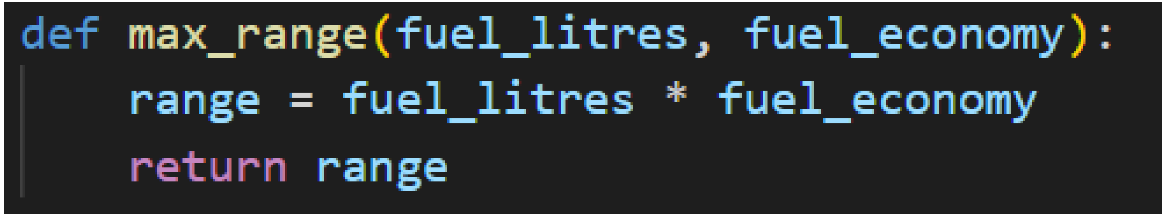
- **Background:** You’ve been hired by an automotive company to be part of their software engineering team. You’ve been selected to be in charge of one of the most important aspects of the car: the onboard entertainment system.

- **Challenge:** You are tasked with designing the backend of a vehicle dashboard and infotainment system that leverages the terminal as opposed to the entertainment system and screen found in cars.

- **Objective:**
  - Design all the functions that will be used by drivers.
  - System should be well documented, easily modifiable and modular.

Determine Max Range Example

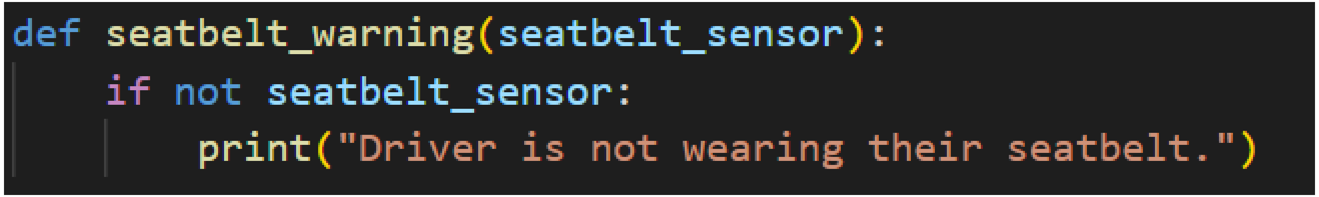
Here we have a function that receives the fuel we have left in litre and our fuel economy (this could have been calculated by another function or you can add a constant here for purposes of this task). We then use these two values to determine the max range with our current fuel level.



```
def max_range(fuel_litres, fuel_economy):
    range = fuel_litres * fuel_economy
    return range
```

Warning Lights Example

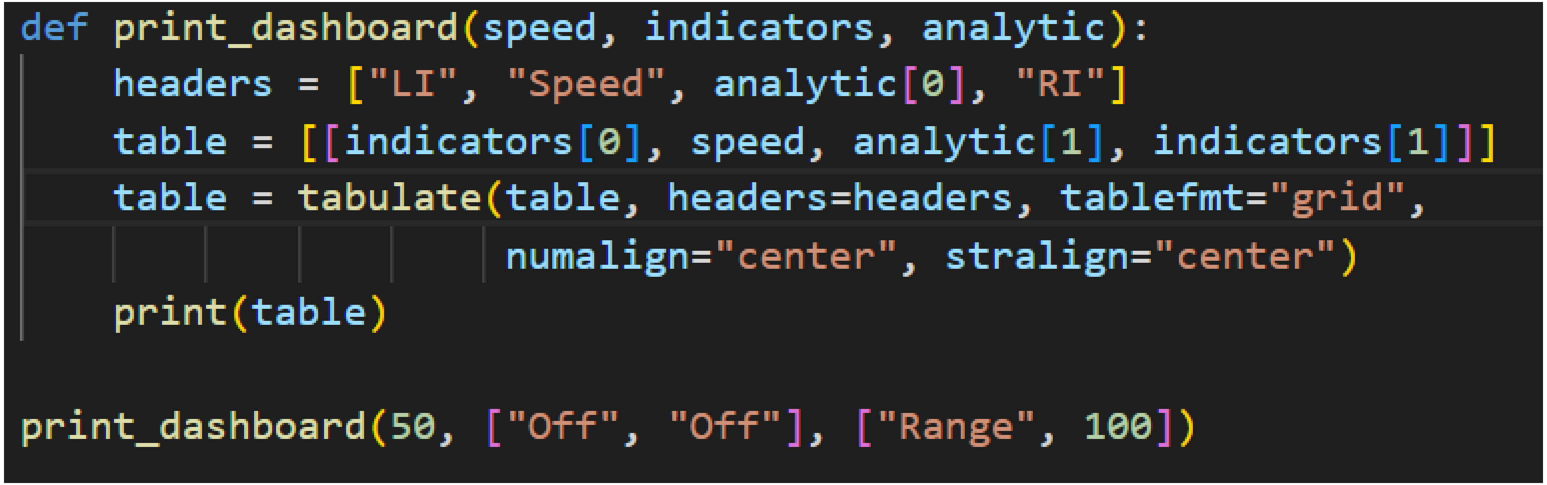
Here we have a function that determines if the driver is wearing a seatbelt or not. The function takes a seatbelt sensor as an argument and uses it to determine the seatbelt state. We then produce a warning to the driver if they are not wearing their seatbelt.



```python
def seatbelt_warning(seatbelt_sensor):
    if not seatbelt_sensor:
        print("Driver is not wearing their seatbelt.")
```

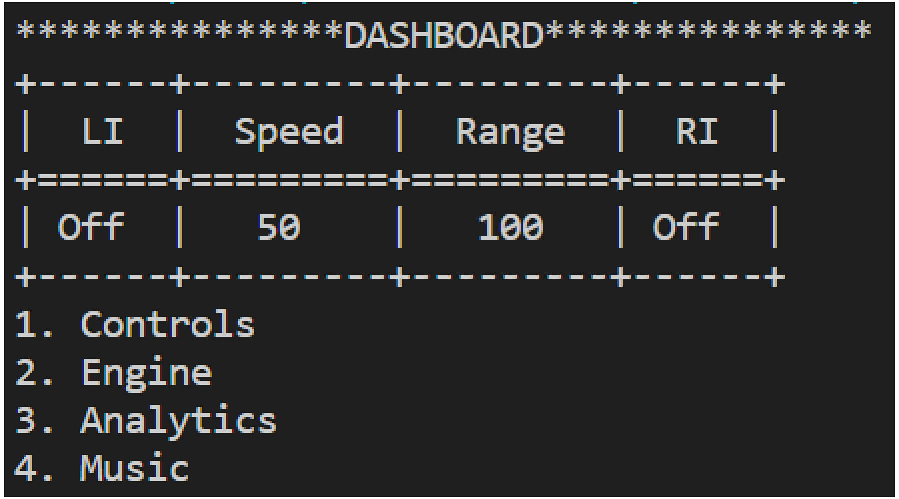
Dashboard Output Example

This is a basic example of how we can present the dashboard to the user. We provide them with the most desired information that they would usually see on their car dashboard.



```python
def print_dashboard(speed, indicators, analytic):
    headers = ["LI", "Speed", analytic[0], "RI"]
    table = [[indicators[0], speed, analytic[1], indicators[1]]]
    table = tabulate(table, headers=headers, tablefmt="grid",
                     numalign="center", stralign="center")
    print(table)

print_dashboard(50, ["Off", "Off"], ["Range", 100])
```

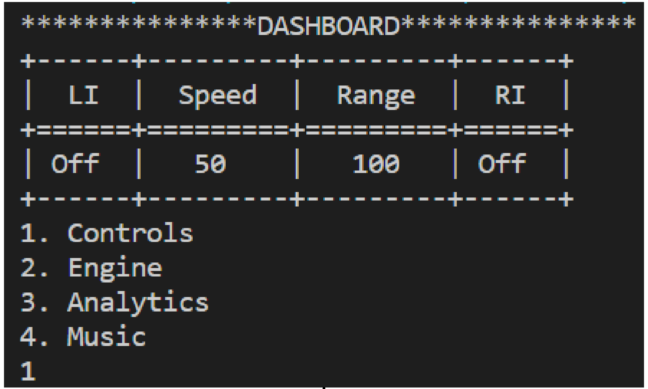
Dashboard Output Example



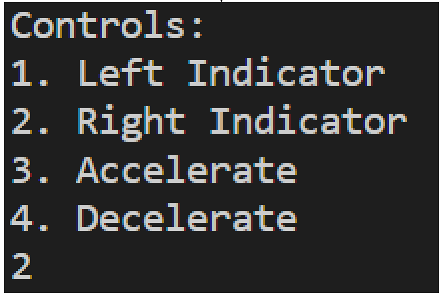
```
***************DASHBOARD***************

+------+---------+---------+------+
|  LI  |  Speed  |  Range  |  RI  |
+======+=========+=========+======+
| Off  |   50    |   100   | Off  |
+------+---------+---------+------+
1. Controls
2. Engine
3. Analytics
4. Music
```

We can also provide the user with the options available to them.

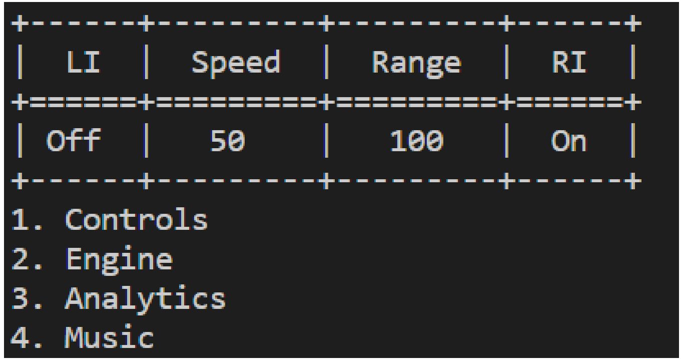
Dashboard Output Example



```
**************DASHBOARD**************
+------+---------+---------+------+
|  LI  |  Speed  |  Range  |  RI  |
+======+=========+=========+======+
| Off  |   50    |   100   | Off  |
+------+---------+---------+------+
1. Controls
2. Engine
3. Analytics
4. Music
1
```



```
Controls:
1. Left Indicator
2. Right Indicator
3. Accelerate
4. Decelerate
2
```



```
+------+---------+---------+------+
|  LI  |  Speed  |  Range  |  RI  |
+======+=========+=========+======+
| Off  |   50    |   100   |  On  |
+------+---------+---------+------+
1. Controls
2. Engine
3. Analytics
4. Music
```

Vehicle Dashboard

You are tasked with designing the backend of a vehicle dashboard and infotainment system which leverages the terminal as opposed to the entertainment system and screen found in cars.

Important features:

1. **Menu:** Provide the user with a menu listing all the available option such as viewing engine details, car analytics, music selection, etc.
2. **Engine:** The user should be able to get detailed information about their engine and should see engine warnings.
3. **Analytics:** The user should be able to view analytics such as their fuel economy, average speed, total distance covered, etc.
4. **Driver:** The driver should be made aware when not wearing a seatbelt or when a car door is open.
5. **Entertainment:** Allow the user to choose their radio channel, select a CD to listen to, or even use a streaming service.

Advanced Challenge:

- Add GPS functionality allowing the user to enter a start and stop location to get the estimate distance.

Summary

Dashboard

★ Create an automotive vehicle dashboard for user to get car information and select entertainment.

Functions

★ Create all the required functionality using your own defined functions. Remember that we are only simulating a dashboard system so we should be creative.

Modular and Modifiable

★ Make sure your functions are modular and modifiable for future changes.

What is the purpose of the return statement in a Python function?

A. It terminates the function execution.

B. It specifies the data type of the function.

C. It returns a value from the function.

D. It defines the function's scope.

What is a parameter in a Python function?

A. A value returned by the function.
B. A variable used in the function definition to receive input.
C. A special type of function.
D. A function's internal name.

Questions and Answers

Questions around the Case Study