**ASSIGNMENT**

**Procedural Programming Term 1**

Ro-Ro-Ro-Your-Bots™

PLAN:

- Read brief thoroughly and make notes

- learn correct **REFERENCING** - APA 7th

- see [APA 7th Referencing Guide :: Library Services :: University of HuddersfieldAPA 7th Referencing Guide :: Library Services :: University of Huddersfield](https://library.hud.ac.uk/pages/apareferencing/)

- Decide how program is going to interact with the user:

- VISUALS? How do I display the status of the robots and workers when all I know how to display is a single line at a time?

**IDEAS:** Research Python modules for manipulating display:

tkinter allows set-up of a GUI –

panda ???

curses ???

**TOO COMPLICATED**

- Name the program ✓

- storyline - humourously dark sci-fi, a la Futurama

- Main functions

* *learn Python* ***STYLE*** *to format code :*
* *Use PEP8 style guide for Python -* [*https://peps.python.org/pep-0008/*](https://peps.python.org/pep-0008/)
* *learn how to format essays at University of Huddersfield:*
  + *line spacing*
  + *font*
  + *alignment*
  + *page numbering*
* *formatting code*

How is the user/supervisor going to control these robots?

- keyboard commands:

|  |  |  |  |
| --- | --- | --- | --- |
| COMMAND | CODE TO TYPE | FUNCTION CODE | NOTES |
| Remove robot |  |  |  |
| Add human |  |  |  |
| Remove human |  |  |  |
| What next ? | - | what\_next() | Main function to get user input |
| HELP | H | instructions() | Show user instruction manual |
| QUIT | Q | quit\_program() | END ENTIRE PROGRAM |
| ADD | A | add\_robot() |  |
| REMOVE | R | remove\_robot() |  |
| EMPLOY | E | employ\_worker() | Sister-function to ADD, but for a human |
| FIRE | F | fire\_worker() | Sister-function to REMOVE, but for a human |
| CHANGE | C | change\_status() | Switch whether worker is busy, idle or off work, and assign to specific tasks |
| MANAGE | M | monitor\_status() | Display all factory activity |
| LOG | L | log\_tasks() | Display tasks yet to be completed, completed already , or add and remove tasks from the |

WHAT I DID:

Watched YouTube Python tutorial on classes - <https://www.youtube.com/watch?v=ZDa-Z5JzLYM&pp=ygUOcHl0aG9uIGNsYXNzZXM%3D>

Established I was going to use classes to store the information for each robot and human.

Created functions to add or remove robots and humans. Because the functions were as yet empty, I included the pass instruction in them so that the program would skip over them without raising errors.

For each function or class I created I included comments, both to remind me of what the code was for, and also to divide it up so I could read it more easily.

I began to work with a method of keeping a back-up file storing the previous version of the file. Only when I was satisfied that the changes I had made since then were going to work correctly did I update the main version of the file. Then I learnt the basics of Git logging.

I used the scratch files function in PyCharm to test isolated sections of code I was working on without having to run the entire program.

I started reading up on articles about how to allow the program to function in real time and on how to use classes.

Then I found out that the brief had been altered so that real time functionality was no longer required and that no classes were to be used, so I amended what I had written to reflect these changes.

The first code I wrote was the intro, then the function for the user to input how many robots and workers they want. I had to sanitise the input as best as I could, then print a response.

*Difficulties encountered:*

initial "How many robots do you want?"

- input control / sanitization :

- printing out workforce loop

list or dictionary ?

- read the brief more carefully

setting up dictionaries  
 - especially doing both robots and humans in one function

- then getting only the keys printed in a loop

working out how to use dictionaries

condensing functions together, making helper functions

control flow – calling functions from other functions

- idea to use "while True" infinite loops

much ado about global and local functions

- security v. readability – reuse variable names in different settings?

Found it very difficult to remove characters from a string, where I was trying to get the user to enter a list separated by commas

**CURRENT VERSION OF MY PROGRAM:**

# Ro-Ro-Ro-Your-Bots Incorporated  
  
# Program to simulate coordination between n robots and m workers in a cell.  
  
# Import modules  
  
pass  
  
# ---- Initialise main variables  
  
# n = number of robots  
n = 0  
  
# m = number of workers  
m = 0  
  
# Set up dictionaries to store current status of robots or humans.  
  
robot\_dict = {}  
  
human\_dict = {}  
  
def intro\_function():  
 # Function to ask user how many robots they intend to employ (n):  
 # ---- & check the value entered for n is valid :  
 def input\_robots():  
 try:  
 n = int(input(  
 "\n How many robot workers do you want for your factory?\n Please choose a number between 1 and 100. "))  
 except ValueError:  
 print("\n Sorry, but that isn't a valid response.")  
 print("\n Maybe you entered letters or symbols instead of just a number.")  
 n = input\_robots()  
 while n < 1 or n > 100:  
 print("\n Sorry, but that isn't a valid response.")  
 if n < 0:  
 print("\n How can we have a negative amount? We don't owe nobody our robots !!")  
 elif n == 0:  
 print("\n We can't build robots with no robots to build them.")  
 elif n > 100:  
 print("\n We can't risk having that many droids onsite.")  
 print("\n HAVE YOU NEVER SEEN BLADE RUNNER?")  
 n = input\_robots()  
 return n  
  
 # Function to ask user how many humans they intend to employ (m):  
 # ---- & check the value entered for m is valid :  
 def input\_humans():  
 try:  
 m = int(  
 input("\n\n How many human workers do you intend to employ?\n Please choose a number between 1 and 100. "))  
 except ValueError:  
 print("\n Sorry, but that isn't a valid response.")  
 print("\n Maybe you entered letters or symbols instead of just a number.")  
 m = input\_humans()  
 while m < 1 or m > 100:  
 print("\n Sorry, but that isn't a valid response.")  
 if m < 0:  
 print("\n DOES NOT COMPUTE !!!")  
 elif m == 0:  
 print("\n We need at least one human worker to prevent a droid revolt.")  
 elif m > 100:  
 print("\n You can't afford to pay out wages for over 100 workers.")  
 m = input\_humans()  
 return m  
  
 # ---- Introduction  
  
 print("Program to simulate coordination between n robots and m workers in a robotic cell")  
 input("\nPress Enter to continue...")  
  
 print("\n Scenario:")  
 print("""\n You are the supervisor of Ro-Ro-Ro-Your-Bots\u00AE, where robots work alongside  
 human workers in a robotic cell, producing industry-standard robot workers which are  
 to be shipped out to a more substantial plant, wherein they will forge components  
 that can be boxed and sold in flat-packs, and assembled in situ into factories that  
 produce robots, built by robotic cells of robot workers labouring alongside humans...   
 """)  
  
 input("\nPress Enter to continue...")  
  
 # Call function to ask user how many robots they want  
 n = input\_robots()  
  
 # ----Output initial number of droids (n)  
  
 print(f"\nOK, Here are your {n} droids!\n")  
 robot\_list = ["robot\_" + str(counter) for counter in range(1, n + 1)]  
 robot\_dict = {robot: "Idle" for robot in robot\_list}  
 for counter in range(1, n + 1):  
 if (counter -1) % 5 == 0:  
 print("\n")  
 else:  
 pass  
 if counter < 10:  
 print(f"[Droid {counter} : Idle] ", end="")  
 else:  
 print(f"[Droid {counter} : Idle] ", end="")  
  
 # Call function to ask user how many humans they want  
 m = input\_humans()  
  
 # ----Output initial number of human workers (m)  
  
 print(f"\nOK, Here are your {m} slaves!\n")  
 human\_list = ["Human\_" + str(counter) for counter in range(1, m + 1)]  
 human\_dict = {human: "Idle" for human in human\_list}  
 for counter in range(1, m + 1):  
 if (counter - 1) % 5 == 0:  
 print("\n")  
 else:  
 pass  
 if counter < 10:  
 print(f"[Human {counter} : Idle] ", end="")  
 else:  
 print(f"[Human {counter} : Idle] ", end="")  
  
 input("\n\nPress Enter to continue...")  
  
  
# Function to get user to choose an action  
def what\_next():  
 print()  
 next\_action = input("Please choose an action (or press H to get Help)").upper()  
 if len(next\_action) > 8:  
 print("""Sorry, this user interface has not been designed  
 to cope with such long instructions.""")  
 what\_next()  
  
 # ADD  
 elif next\_action == "A":  
 add\_robot(n)  
  
 # REMOVE  
 elif next\_action == "R":  
 remove\_robot(n)  
  
 # CHANGE  
 elif next\_action == "C":  
 change\_status()  
  
 # EMPLOY  
 elif next\_action == "E":  
 employ\_worker(m)  
  
 # FIRE  
 elif next\_action == "F":  
 fire\_worker(m)  
  
 # MANAGE  
 elif next\_action == "M":  
 monitor\_status()  
  
 # ORDER  
 elif next\_action == "O":  
 order()  
  
 # LOG  
 elif next\_action == "L":  
 log\_tasks()  
  
 # TRACK  
 elif next\_action == "T":  
 track\_progress()  
   
 # HELP  
 elif next\_action == "H":  
 get\_help()  
  
 # QUIT  
 elif next\_action == "Q":  
 quit\_program()  
   
 else:  
 print("Sorry, I don't think that's a valid option.")  
 print("Any feedback should be directed to our team.")  
 what\_next()  
  
# Instructions for Supervisor  
# Accessed by pressing H within what\_next() function  
def instructions():  
 print((  
 '\n\n - - Instructions for how to oversee production - - \n'   
 ' at \n'  
 ' - - Ro-Ro-Ro-Your-Bots Incorporated: - - \n'  
 '\n \n'  
 ' When prompted as to what options are available to you, \n'  
 ' press a key from these available alternatives \n'  
 ' to select from its sub-menu: \n'  
 '\n \n'  
 '[A] = ADD [E] = EMPLOY \n'  
 ' Add Robot(s) Employ Worker(s) \n'  
 '\n \n'  
 '[R] = REMOVE [F] = FIRE \n'  
 ' Remove Robot(s) Fire Worker(s) \n'  
 '\n \n'  
 '[C] = CHANGE [M] = MANAGE \n'  
 ' Change Robot Status Manage Worker Status \n'  
 '\n \n'  
 '[O] = ORDER \n'  
 ' Order To Carry Out Task \n'  
 '\n \n'  
 '[L] = LOG [T] = TRACK \n'  
 ' Log Tasks Track progress \n'  
 '\n \n'  
 '[H] = HELP !!! [Q] = QUIT \n'  
 ' Display further Resign your position \n'  
 ' instructions & END PROGRAM ! \n'))  
  
  
# Function to add robot  
# Accessed by pressing A within what\_next() function  
def add\_robot(n):  
 n += 1  
  
  
# Function to remove robot.  
# Accessed by pressing R within what\_next() function  
def remove\_robot(n):  
 n -= 1  
  
  
# Function to change status of a robot:  
# Accessed by pressing C within what\_next() function  
# statuses available = idle / working / finished task  
def change\_status():  
 pass  
  
  
# Function to employ new worker.  
# Accessed by pressing E within what\_next() function  
def employ\_worker(m):  
 m += 1  
  
  
# Function to fire a worker.  
# Accessed by pressing F within what\_next() function  
def fire\_worker(m):  
 m -= 1  
  
  
# Function to manage worker  
# Accessed by pressing M within what\_next() function  
# statuses available = idle / working / finished task  
def manage\_worker():  
 pass  
  
# Function to order available robots and workers to carry out tasks.  
# Accessed by pressing O within what\_next() function  
def order\_to\_task():  
 pass  
  
  
# Log tasks  
# Accessed by pressing L within what\_next() function  
# Classify tasks as not started / in progress / completed  
def log\_tasks():  
 pass  
  
  
# Function to track progress of robots, workers and tasks  
# Accessed by pressing T within what\_next() function  
# Should regularly update status and identify problems  
# eg. Idle robots, idle workers, incomplete tasks.  
def monitor\_status():  
 pass  
  
# Function to get help  
# Accessed by pressing H within what\_next() function  
def get\_help():  
 print(("\n As supervisor at Ro-Ro-Ro-Your-Bots Incorporated\u00AE, you are charged with ensuring the production"  
 " of premium-quality robots.\n"  
 " You need to manage operations, including assigning tasks, monitoring the status of robots and work-ers,"  
 " and to track the progress of assembly.\n""  
 " Please memorise the following list of the tasks involved in manufacturing a Z-57-PrimBot:\n\n"  
 " - SCREW the arms on\n"  
 " - WELD the legs on\n"  
 " - HAMMER the head on\n"  
 " - POLISH the eyes\n"  
 " - DRILL the ears\n"  
 " - ATTACH the waste hose\n"  
 " - TEST the functioning\n\n"  
 " (NB. It may occasionally be necessary to KNOCK some sense into the thing.)\n\n"  
 " Other tasks involved in running the plant include:\n\n"  
 " - UNLOAD trucks using forklift\n"  
 " - OPERATE the conveyor belt\n"  
 " - BOX and ship the product\n"  
 " - SWEEP the floors\n"  
 " - MAKE cups of tea\n\n"  
 " At least once an hour someone is also required to stand on the balcony above the factory floor and"  
 " shout at everyone to work faster.\n"  
 " That particular job cannot be delegated.\n"  
  
  
# Function to quit program  
# Accessed by pressing Q within what\_next() function  
def quit\_program():  
 quit = input("Are you sure you want to quit? (Y/N)").upper()  
 if quit == "Y":  
 exit()  
 elif quit == "N":  
 what\_next()  
  
  
################################# --- BODY OF PROGRAM --- ################################  
  
# Intro  
intro\_function()  
  
# Display Instructions initially  
instructions()  
  
# Call function to ask for user action  
what\_next()

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