



# **American International University- Bangladesh**

## **Faculty of Science and Technology**

**Project Title:** Develop a computer lab management application using Python

### **Mid Project Report**

**Spring 2022-2023**

**Course Name:** PROGRAMMING IN PYTHON

**Section:** B

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## **Project overview:**

The PC lab management application is a console-based program that allows users to keep records of all the PCs in a lab. The application provides features such as adding new PCs, updating existing PC information, removing PCs, displaying all or individual PC information, searching for a particular PC, and storing PC information in a text file. The application will have a menu-based interface that allows users to select the desired action.

### **Data Structure:**

To maintain the records of the PCs in the lab, we need a data structure to store and manage this information. A suitable data structure for this task could be a dictionary or a list of dictionaries. Each dictionary would represent a single PC and contain the PC's number, operating system, and status information.

### **Adding functionality:**

The 'adding functionality' of the PC lab management application allows users to add new PCs to the lab. When adding a new PC, the user will be prompted to enter the PC's number, operating system, and status information. The application will then create a new dictionary to store this information and add it to the list of PCs.

### **Updating functionality:**

The 'updating functionality' of the PC lab management application allows users to update the information of an existing PC. To update an existing PC, the user will be prompted to enter the PC's number and then choose which information they want to update (operating system or status). Once the user has entered the new information, the application will update the corresponding dictionary in the list of PCs.

### **Remove functionality:**

The 'remove functionality' of the PC lab management application allows users to remove an existing PC from the lab. To remove a PC, the user will be prompted to enter the PC's number, and then the corresponding dictionary will be removed from the list of PCs.

### **All PC display functionality:**

The 'all PC display functionality' of the PC lab management application allows users to display information about all the PCs in the lab. When this option is selected from the menu, the application will display the PC number, operating system, and status information for all the PCs in the list.

### **Individual PC display functionality:**

The 'individual PC display functionality' of the PC lab management application allows users to display all the information about a specific PC in the lab. When this option is selected from the menu, the user will be prompted to enter the PC's number, and then the corresponding dictionary will be displayed with its PC number, operating system, and status information.



### Search functionality:

The 'search functionality' of the PC lab management application allows users to search for a specific PC in the lab. When this option is selected from the menu, the user will be prompted to enter the PC's number. If the PC is already in the list, the corresponding dictionary will be displayed. If the PC is not in the list, the user will be prompted to add the new PC to the lab.

### Checking functionality:

The 'checking functionality' of the PC lab management application ensures that each PC in the lab has a unique PC number. When adding a new PC, the application will check if a PC with the same PC number already exists in the lab. If it does, the application will prompt the user to modify the existing PC's information, remove the PC from the lab, or take no action.

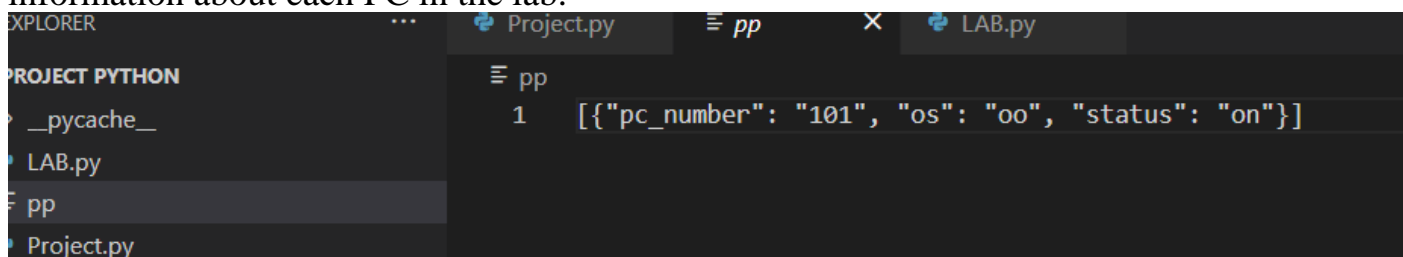
### Store functionality:

The 'store functionality' of the PC lab management application allows users to store all the PC information in a text file for safekeeping. When this option is selected from the menu, the user will be prompted to enter a filename. The application will then write the PC information to a text file with the given filename.

In summary, the PC lab management application provides an efficient and user-friendly way to manage and maintain records of the PCs in a lab. With features such as adding, updating, and removing PCs, displaying information about all or individual PCs, searching for a specific PC, and storing PC information in a text file, the application ensures that lab administrators can keep track of their PCs easily and effectively.

### Project solution design:

1. User Interface: We can start by creating a simple menu-based user interface using the built-in input() function. The menu should contain options to add a new PC, update an existing PC, remove a PC, display information about all PCs, display information about a specific PC, search for a PC, and quit the application.
2. Data Structure: As mentioned earlier, we can use a list of dictionaries to store information about each PC in the lab.



The screenshot shows a code editor with a file explorer on the left and a code editor on the right. The file explorer shows a project named 'PROJECT PYTHON' with files like '\_\_pycache\_\_', 'LAB.py', 'pp', and 'Project.py'. The code editor shows a Python list of dictionaries: 

```
1 [{"pc_number": "101", "os": "oo", "status": "on"}]
```

3. Core Functions: We will need several core functions to implement the functionality of the application, such as add\_pc(), update\_pc(), remove\_pc(), display\_all\_pcs(), display\_pc(), search\_pc(), and find\_pc\_index().
4. Validation: We will need to add validation to ensure that the user inputs are in the correct format and that the program does not crash if the user enters invalid inputs.



5. File Handling: Finally, we can add file handling functionality to allow the user to store all the PC information in a text file if they want to maintain a physical copy. We can use the built-in `open()` function to create and write to a text file.

```
70
71     def store_pcs(self, filename):
72         with open(filename, 'w') as f:
73             json.dump([p.__dict__ for p in self.pcs], f)
74             print("*****PCs stored successfully.*****")
75
76     def load_pcs(self, filename):
77         with open(filename, 'r') as f:
78             data = json.load(f)
79             self.pcs = [PC(p['pc_number'], p['os'], p['status']) for p in data]
80             print("*****PCs loaded successfully.*****")
```

Overall, this project can be implemented in a modular fashion by breaking it down into several functions and using a menu-based user interface to provide easy access to the application's functionality.

## Implementation:

```
import json

class PC:
    def __init__(self, pc_number, os, status):
        self.pc_number = pc_number
        self.os = os
        self.status = status

class Lab:
    def __init__(self):
        self.pcs = []

    def add_pc(self, pc):
        for p in self.pcs:
            if p.pc_number == pc.pc_number:
                choice = input("PC with same number already exists. Do you want to modify (M), remove (R), or take no action (N)?")
                if choice.lower() == 'm':
                    p.os = pc.os
                    p.status = pc.status
                    return "--*****PC information modified successfully.---*****"
                elif choice.lower() == 'r':
                    self.pcs.remove(p)
                    return "*****PC removed successfully.*****"
                else:
                    return "*****No action taken.*****"
        self.pcs.append(pc)
        return "*****PC added successfully.*****"
```



```

def remove_pc(self, pc_number):
    for p in self.pcs:
        if p.pc_number == pc_number:
            self.pcs.remove(p)
            return "*****PC removed successfully.*****"
    return "*****PC not found.*****"

def update_pc(self, pc):
    for p in self.pcs:
        if p.pc_number == pc.pc_number:
            p.os = pc.os
            p.status = pc.status
            return "*****PC information modified successfully.*****"
    return "PC not found."

def display_all_pcs(self):
    for p in self.pcs:
        print("PC Number:", p.pc_number)
        print("Operating System:", p.os)
        print("Status:", p.status)
        print()

def display_pc_info(self, pc_number):
    for p in self.pcs:
        if p.pc_number == pc_number:
            print("PC Number:", p.pc_number)
            print("Operating System:", p.os)
            print("Status:", p.status)
            return
    print("PC not found.")

def search_pc(self, pc_number):
    for p in self.pcs:
        if p.pc_number == pc_number:
            print("PC Number:", p.pc_number)
            print("Operating System:", p.os)
            print("Status:", p.status)
            return
    pc = PC(pc_number, input("Enter operating system: "), input("Enter status: "))
    self.add_pc(pc)
    print("*****PC added successfully.*****")

def store_pcs(self, filename):
    with open(filename, 'w') as f:
        json.dump([p.__dict__ for p in self.pcs], f)
    print("*****PCs stored successfully.*****")

def load_pcs(self, filename):

```



```

with open(filename, 'r') as f:
    data = json.load(f)
self.pcs = [PC(p['pc_number'], p['os'], p['status']) for p in data]
print("*****PCs loaded successfully.*****")

def main():
    lab = Lab()
    while True:
        print("1. Add PC")
        print("2. Update PC")
        print("3. Remove PC")
        print("4. Display all PCs")
        print("5. Display PC information")
        print("6. Search for PC")
        print("7. Store PCs")
        print("8. Load PCs")
        print("9. Quit")
        choice = input("Enter your choice: ")
        if choice == '1':
            pc_number = input("Enter PC number: ")
            os = input("Enter operating system: ")
            status = input("Enter status: ")
            pc = PC(pc_number, os, status)
            print(lab.add_pc(pc))
        elif choice == '2':
            pc_number = input("Enter PC number: ")
            os = input("Enter operating system: ")
            status = input("Enter status: ")
            pc = PC(pc_number, os, status)
            print(lab.update_pc(pc))
        elif choice == '3':
            pc_number = input("Enter PC number: ")
            print(lab.remove_pc(pc_number))
        elif choice == '4':
            lab.display_all_pcs()
        elif choice == '5':
            pc_number = input("Enter PC number: ")
            lab.display_pc_info(pc_number)
        elif choice == '6':
            pc_number = input("Enter PC number: ")
            lab.search_pc(pc_number)
        elif choice == '7':
            filename = input("Enter file name: ")
            lab.store_pcs(filename)
        elif choice == '8':
            filename = input("Enter file name: ")
            lab.load_pcs(filename)
        elif choice == '9':

```



```

        print("GOOD Bye.using again please.")
        break
    else:
        print("Invalid choice. Please enter a number from 1 to 9.")
main()

```

## Application Overview:

**Adding functionality:** To add a new pc type 1, then give the input .If input is correct pc added successfully .

The screenshot shows a Jupyter Notebook with a file explorer on the left containing 'LAB.py', 'pp', and 'Project.py'. The main editor displays the following Python code:

```

11 self.pcs = []
12
13 def add_pc(self, pc):
14     for p in self.pcs:
15         if p.pc_number == pc.pc_number:
16             choice = input("PC with same number already exists. Do you want to modify (M), remove (R), or take no
17             if choice.lower() == 'm':
18                 p.os = pc.os
19                 p.status = pc.status
20                 return "*****PC information modified successfully.*****"
21             elif choice.lower() == 'r':
22                 self.pcs.remove(p)
23                 return "*****PC removed successfully.*****"
24             else:
25                 return "*****No action taken.*****"
26     self.pcs.append(pc)
27     return "*****PC added successfully.*****"
28
29 def remove_pc(self, pc_number):
30     for p in self.pcs:

```

The terminal output shows the command to run the script and the following interaction:

```

PS C:\Users\HP\Documents\Project python> & C:/Users/HP/anaconda3/python.exe "c:/Users/HP/Documents/Project python/Project.py"
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: 1
Enter PC number: 102
Enter operating system: linux
Enter status: on
*****PC added successfully.*****
1. Add PC
2. Update PC

```

**Update functionality:** To update a pc information first enter choice 2.Then enter the pc number .If the number you type is not found than console show pc not found.

```

*****PC information modified successfully.*
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: 2
Enter PC number: 105
Enter operating system: ol
Enter status: pl
PC not found.

```



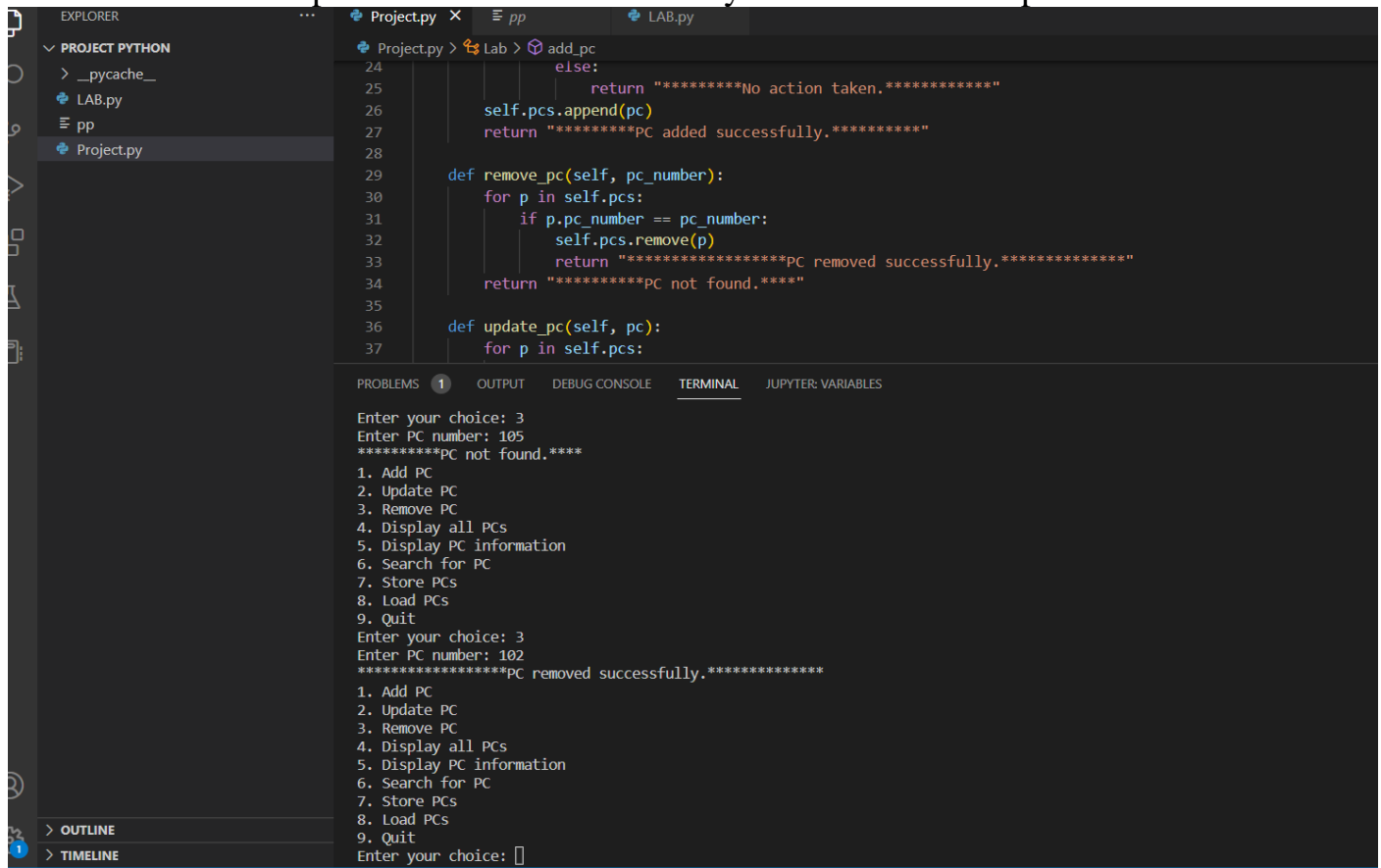
On the other hand if pc number is available than you can change the status of the pc.

```

_pycache_
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p
project.py
31         if p.pc_number == pc_number:
32             self.pcs.remove(p)
33             return "*****PC removed successfully.*****"
34         return "*****PC not found.***"
35
36     def update_pc(self, pc):
37         for p in self.pcs:
38             if p.pc_number == pc.pc_number:
39                 p.os = pc.os
40                 p.status = pc.status
41                 return "*****PC information modified successfully.*****"
42         return "PC not found."
43
44     def display_all_pcs(self):
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```



On the other hand if pc number is available than you can remove the pc.



The screenshot shows a JupyterLab environment with a file explorer on the left and a code editor on the right. The file explorer shows a project named 'PROJECT PYTHON' with files like 'LAB.py', 'pp', and 'Project.py'. The code editor displays a Python script with methods for adding, removing, and updating PCs. The terminal window at the bottom shows the execution of the script, where a user enters choice 3 and PC number 105, resulting in a 'PC not found' message. The menu is then displayed, and the user enters choice 3 again, followed by PC number 102, resulting in a 'PC removed successfully' message.

```
24         else:
25             return "*****No action taken.*****"
26         self.pcs.append(pc)
27         return "*****PC added successfully.*****"
28
29     def remove_pc(self, pc_number):
30         for p in self.pcs:
31             if p.pc_number == pc_number:
32                 self.pcs.remove(p)
33                 return "*****PC removed successfully.*****"
34         return "*****PC not found.*****"
35
36     def update_pc(self, pc):
37         for p in self.pcs:
```

PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL JUPYTER: VARIABLES

Enter your choice: 3  
Enter PC number: 105  
\*\*\*\*\*PC not found.\*\*\*\*\*

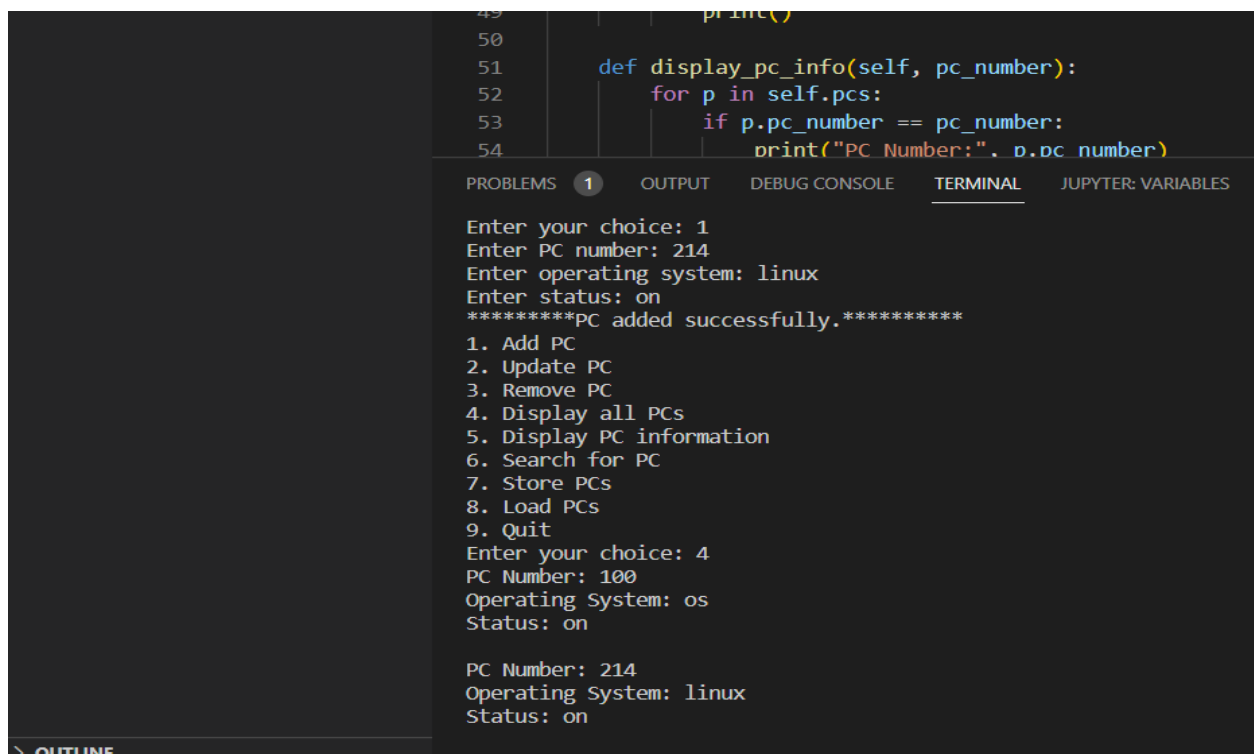
1. Add PC  
2. Update PC  
3. Remove PC  
4. Display all PCs  
5. Display PC information  
6. Search for PC  
7. Store PCs  
8. Load PCs  
9. Quit

Enter your choice: 3  
Enter PC number: 102  
\*\*\*\*\*PC removed successfully.\*\*\*\*\*

1. Add PC  
2. Update PC  
3. Remove PC  
4. Display all PCs  
5. Display PC information  
6. Search for PC  
7. Store PCs  
8. Load PCs  
9. Quit

Enter your choice: []

**Display All pc functionality:** To display all pcs information first enter choice 4.



The screenshot shows a JupyterLab environment with a file explorer on the left and a code editor on the right. The file explorer shows a project named 'PROJECT PYTHON' with files like 'LAB.py', 'pp', and 'Project.py'. The code editor displays a Python script with a method for displaying PC information. The terminal window at the bottom shows the execution of the script, where a user enters choice 1, PC number 214, operating system 'linux', and status 'on', resulting in a 'PC added successfully' message. The menu is then displayed, and the user enters choice 4, followed by PC number 100, operating system 'os', and status 'on', resulting in the display of PC information for PC number 214.

```
49         print()
50
51     def display_pc_info(self, pc_number):
52         for p in self.pcs:
53             if p.pc_number == pc_number:
54                 print("PC Number:", p.pc_number)
```

PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL JUPYTER: VARIABLES

Enter your choice: 1  
Enter PC number: 214  
Enter operating system: linux  
Enter status: on  
\*\*\*\*\*PC added successfully.\*\*\*\*\*

1. Add PC  
2. Update PC  
3. Remove PC  
4. Display all PCs  
5. Display PC information  
6. Search for PC  
7. Store PCs  
8. Load PCs  
9. Quit

Enter your choice: 4  
PC Number: 100  
Operating System: os  
Status: on

PC Number: 214  
Operating System: linux  
Status: on



**Display a pc functionality:** To display a pc information first enter choice 5. Then enter the pc number if pc exists it show the information.

```
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: 5
Enter PC number: 100
PC Number: 100
Operating System: os
Status: on
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: []
```

Ln 21, Col 44 Space

**Search pc functionality:** To search a pc information first enter choice 6. Then enter the pc number if pc exists it show the information.

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER VARIABLES
Status: on
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: 6
Enter PC number: 100
PC Number: 100
Operating System: os
Status: on
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: []
```

Ln 21, Col 44 Spaces: 4 UTF-8 CRLF Python 3.9.13 (base: conda)

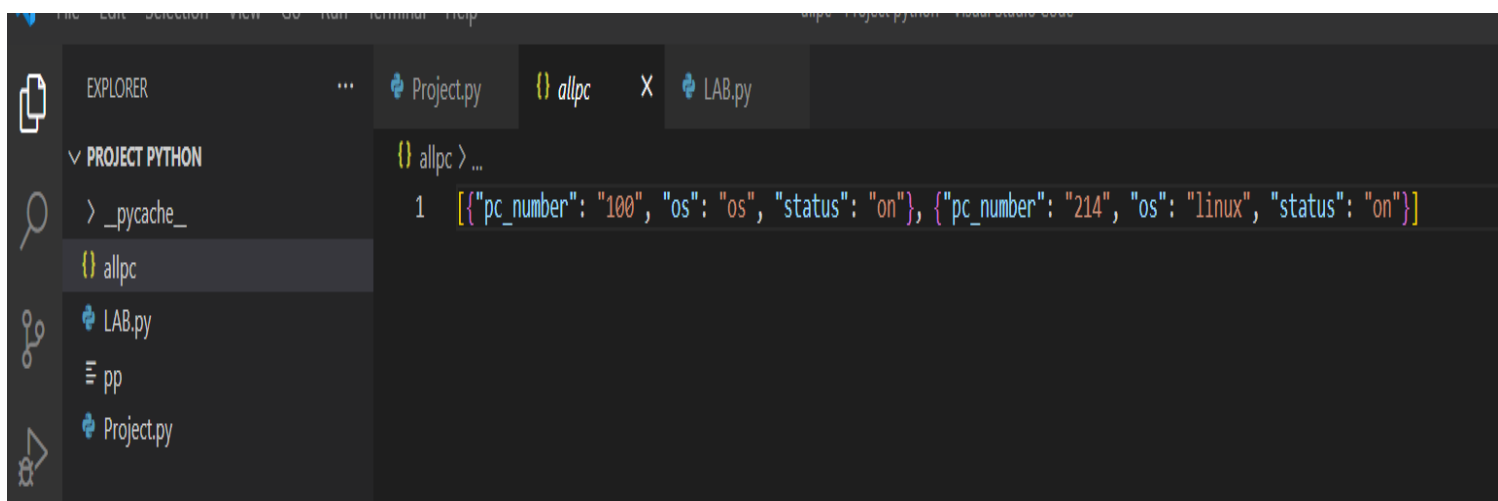

26°C  
Haze

1:52 AM  
25/02/2023



**Store functionality:** To Store all pc information first enter choice 7. The 'store functionality' of the PC lab management application allows users to store all the PC information in a text file for safekeeping. When this option is selected from the menu, the user will be prompted to enter a filename.

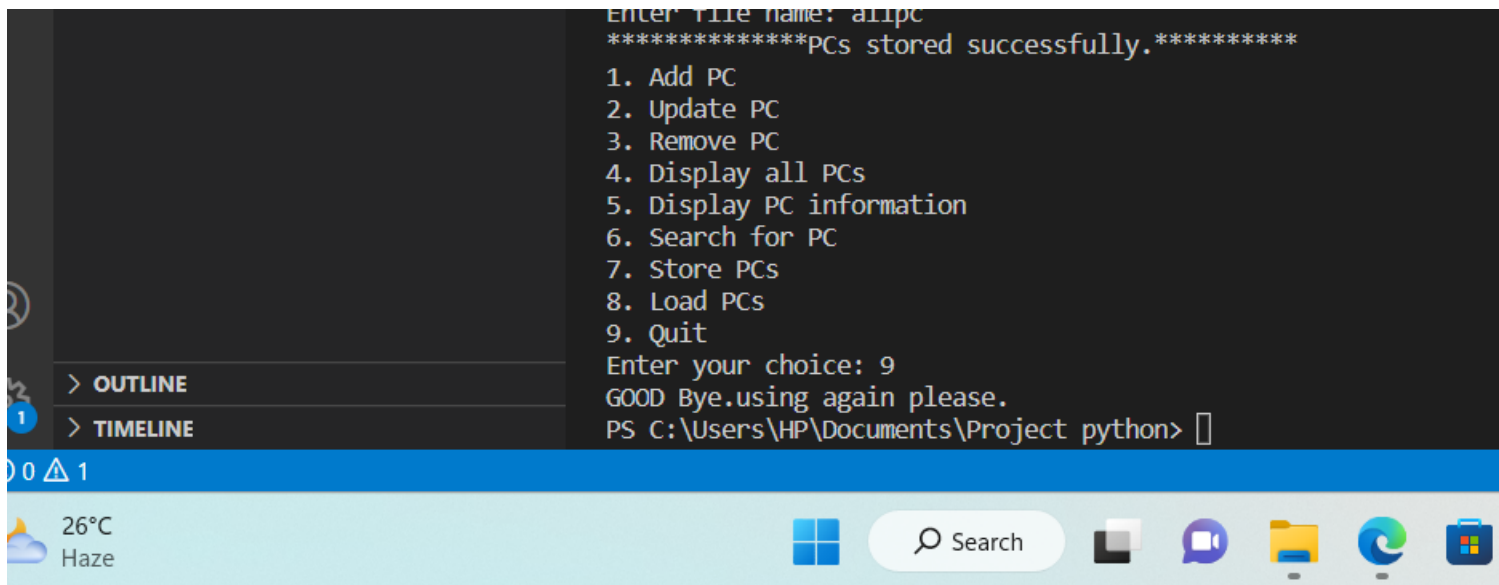
```
PC Number: 100
Operating System: os
Status: on
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: 7
Enter file name: allpc
*****PCs stored successfully.*****
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: []
```



```
{ } allpc > ...
1 [{"pc_number": "100", "os": "os", "status": "on"}, {"pc_number": "214", "os": "linux", "status": "on"}]
```



Quit functionality: To exit the program enter your choice 9.



```
Enter file name: alipc
*****PCs stored successfully.*****
1. Add PC
2. Update PC
3. Remove PC
4. Display all PCs
5. Display PC information
6. Search for PC
7. Store PCs
8. Load PCs
9. Quit
Enter your choice: 9
GOOD Bye.using again please.
PS C:\Users\HP\Documents\Project python>
```

