Assignment 4: Implementing Control Structures

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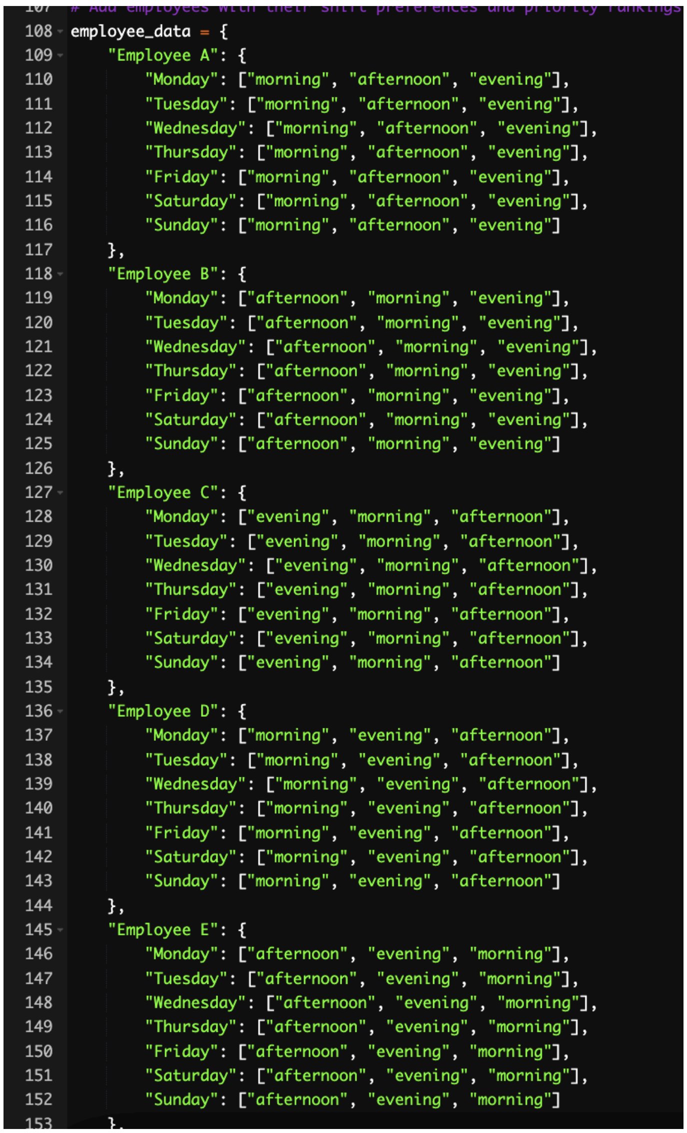
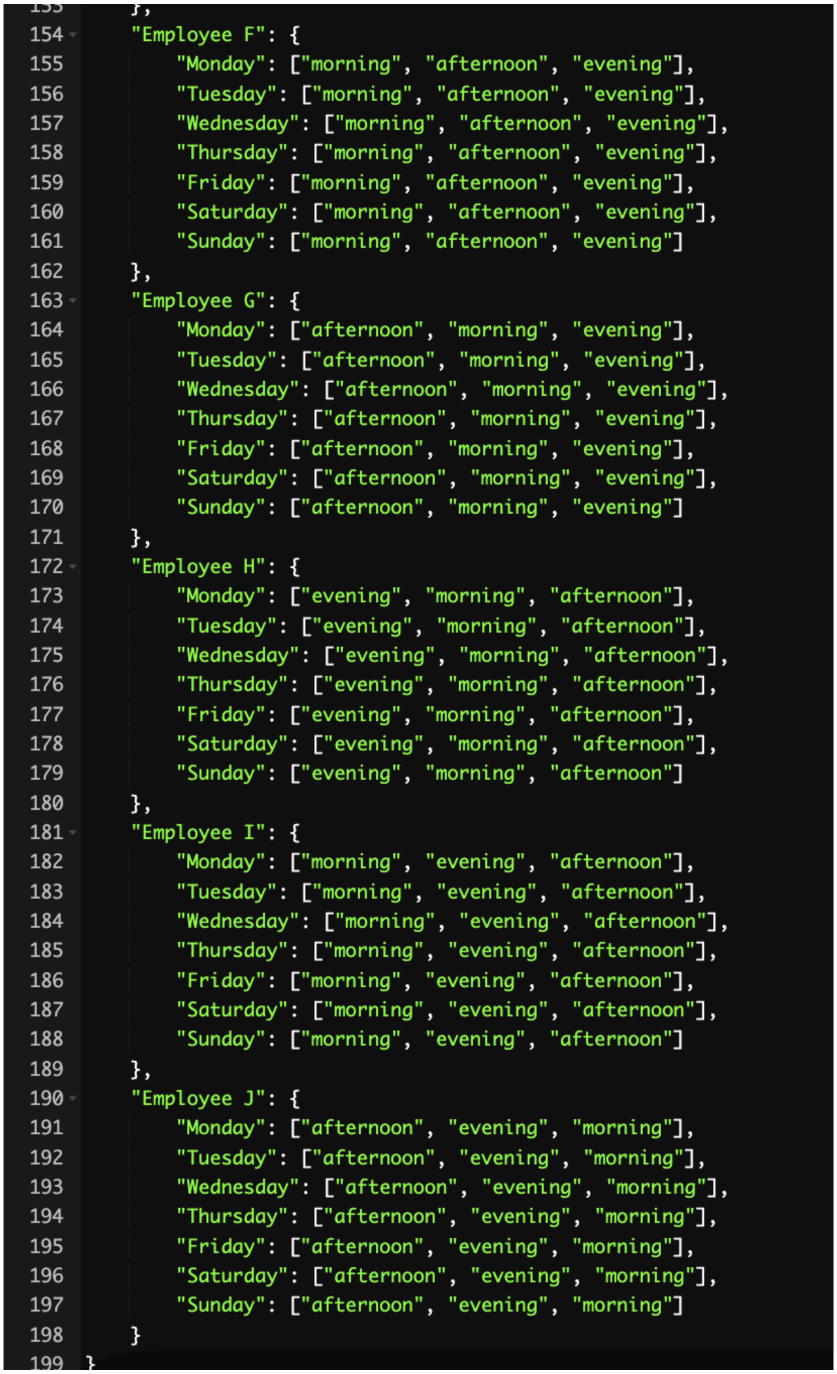
Github:- https://github.com/ndhinaharan36295/MSCS-632_Assignment4_Control-Structures

Schedule Output:-

I ran the Python and JavaScript code from the above repo, using the given the input data in https://github.com/ndhinaharan36295/MSCS-632_Assignment4_Control-Structures/blob/c409124d4fe82161e35df154aa265d26c1568d0f/employee_scheduler.js#L123-L214



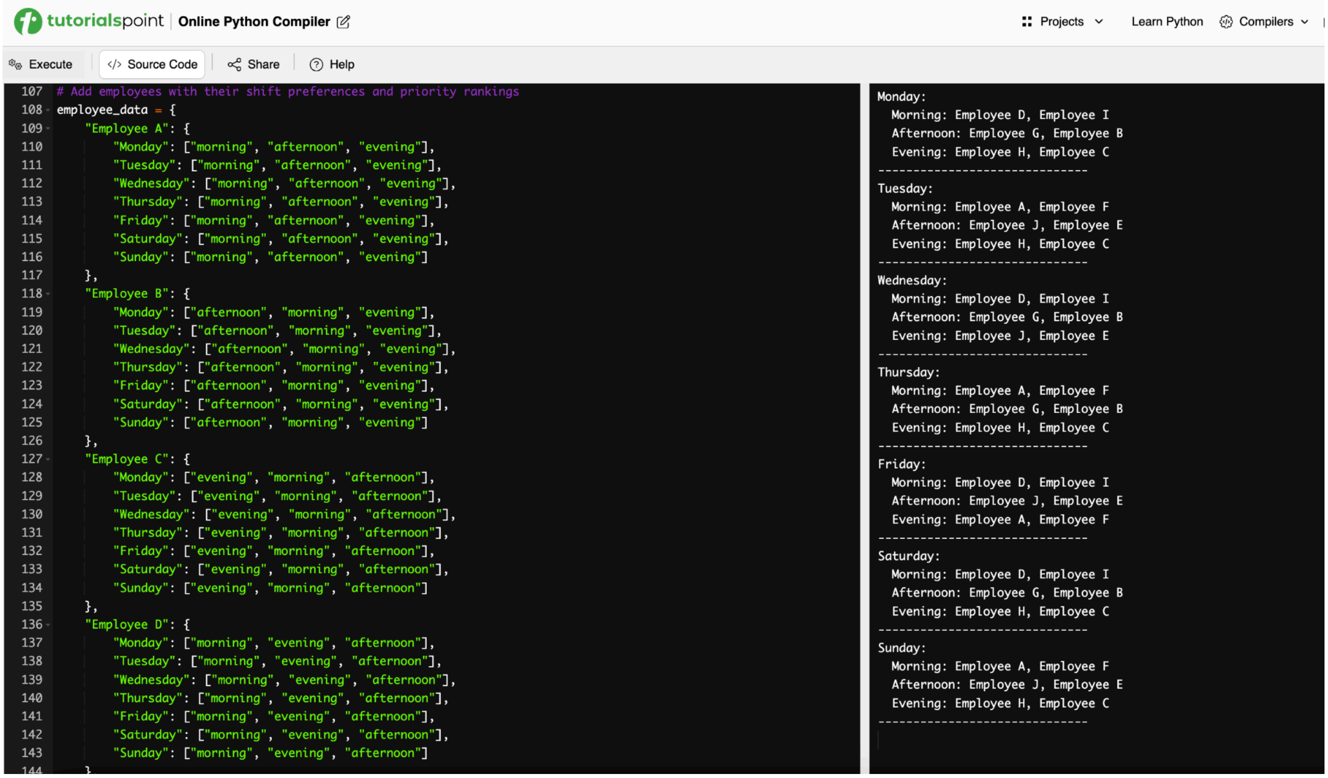
```
# Add employees with their shift preferences and priority rankings
employee_data = {
    "Employee A": {
        "Monday": ["morning", "afternoon", "evening"],
        "Tuesday": ["morning", "afternoon", "evening"],
        "Wednesday": ["morning", "afternoon", "evening"],
        "Thursday": ["morning", "afternoon", "evening"],
        "Friday": ["morning", "afternoon", "evening"],
        "Saturday": ["morning", "afternoon", "evening"],
        "Sunday": ["morning", "afternoon", "evening"]
    },
    "Employee B": {
        "Monday": ["afternoon", "morning", "evening"],
        "Tuesday": ["afternoon", "morning", "evening"],
        "Wednesday": ["afternoon", "morning", "evening"],
        "Thursday": ["afternoon", "morning", "evening"],
        "Friday": ["afternoon", "morning", "evening"],
        "Saturday": ["afternoon", "morning", "evening"],
        "Sunday": ["afternoon", "morning", "evening"]
    },
    "Employee C": {
        "Monday": ["evening", "morning", "afternoon"],
        "Tuesday": ["evening", "morning", "afternoon"],
        "Wednesday": ["evening", "morning", "afternoon"],
        "Thursday": ["evening", "morning", "afternoon"],
        "Friday": ["evening", "morning", "afternoon"],
        "Saturday": ["evening", "morning", "afternoon"],
        "Sunday": ["evening", "morning", "afternoon"]
    },
    "Employee D": {
        "Monday": ["morning", "evening", "afternoon"],
        "Tuesday": ["morning", "evening", "afternoon"],
        "Wednesday": ["morning", "evening", "afternoon"],
        "Thursday": ["morning", "evening", "afternoon"],
        "Friday": ["morning", "evening", "afternoon"],
        "Saturday": ["morning", "evening", "afternoon"],
        "Sunday": ["morning", "evening", "afternoon"]
    },
    "Employee E": {
        "Monday": ["afternoon", "evening", "morning"],
        "Tuesday": ["afternoon", "evening", "morning"],
        "Wednesday": ["afternoon", "evening", "morning"],
        "Thursday": ["afternoon", "evening", "morning"],
        "Friday": ["afternoon", "evening", "morning"],
        "Saturday": ["afternoon", "evening", "morning"],
        "Sunday": ["afternoon", "evening", "morning"]
    },
```



```
    },
    "Employee F": {
        "Monday": ["morning", "afternoon", "evening"],
        "Tuesday": ["morning", "afternoon", "evening"],
        "Wednesday": ["morning", "afternoon", "evening"],
        "Thursday": ["morning", "afternoon", "evening"],
        "Friday": ["morning", "afternoon", "evening"],
        "Saturday": ["morning", "afternoon", "evening"],
        "Sunday": ["morning", "afternoon", "evening"]
    },
    "Employee G": {
        "Monday": ["afternoon", "morning", "evening"],
        "Tuesday": ["afternoon", "morning", "evening"],
        "Wednesday": ["afternoon", "morning", "evening"],
        "Thursday": ["afternoon", "morning", "evening"],
        "Friday": ["afternoon", "morning", "evening"],
        "Saturday": ["afternoon", "morning", "evening"],
        "Sunday": ["afternoon", "morning", "evening"]
    },
    "Employee H": {
        "Monday": ["evening", "morning", "afternoon"],
        "Tuesday": ["evening", "morning", "afternoon"],
        "Wednesday": ["evening", "morning", "afternoon"],
        "Thursday": ["evening", "morning", "afternoon"],
        "Friday": ["evening", "morning", "afternoon"],
        "Saturday": ["evening", "morning", "afternoon"],
        "Sunday": ["evening", "morning", "afternoon"]
    },
    "Employee I": {
        "Monday": ["morning", "evening", "afternoon"],
        "Tuesday": ["morning", "evening", "afternoon"],
        "Wednesday": ["morning", "evening", "afternoon"],
        "Thursday": ["morning", "evening", "afternoon"],
        "Friday": ["morning", "evening", "afternoon"],
        "Saturday": ["morning", "evening", "afternoon"],
        "Sunday": ["morning", "evening", "afternoon"]
    },
    "Employee J": {
        "Monday": ["afternoon", "evening", "morning"],
        "Tuesday": ["afternoon", "evening", "morning"],
        "Wednesday": ["afternoon", "evening", "morning"],
        "Thursday": ["afternoon", "evening", "morning"],
        "Friday": ["afternoon", "evening", "morning"],
        "Saturday": ["afternoon", "evening", "morning"],
        "Sunday": ["afternoon", "evening", "morning"]
    }
}
```

As shown in the above input, I chose 10 employees to work in the company and the scheduler handles all the required conditions and generates a schedule for the employees. The output is shown below

Output:-



```
# Add employees with their shift preferences and priority rankings
employee_data = {
    "Employee A": {
        "Monday": ["morning", "afternoon", "evening"],
        "Tuesday": ["morning", "afternoon", "evening"],
        "Wednesday": ["morning", "afternoon", "evening"],
        "Thursday": ["morning", "afternoon", "evening"],
        "Friday": ["morning", "afternoon", "evening"],
        "Saturday": ["morning", "afternoon", "evening"],
        "Sunday": ["morning", "afternoon", "evening"]
    },
    "Employee B": {
        "Monday": ["afternoon", "morning", "evening"],
        "Tuesday": ["afternoon", "morning", "evening"],
        "Wednesday": ["afternoon", "morning", "evening"],
        "Thursday": ["afternoon", "morning", "evening"],
        "Friday": ["afternoon", "morning", "evening"],
        "Saturday": ["afternoon", "morning", "evening"],
        "Sunday": ["afternoon", "morning", "evening"]
    },
    "Employee C": {
        "Monday": ["evening", "morning", "afternoon"],
        "Tuesday": ["evening", "morning", "afternoon"],
        "Wednesday": ["evening", "morning", "afternoon"],
        "Thursday": ["evening", "morning", "afternoon"],
        "Friday": ["evening", "morning", "afternoon"],
        "Saturday": ["evening", "morning", "afternoon"],
        "Sunday": ["evening", "morning", "afternoon"]
    },
    "Employee D": {
        "Monday": ["morning", "evening", "afternoon"],
        "Tuesday": ["morning", "evening", "afternoon"],
        "Wednesday": ["morning", "evening", "afternoon"],
        "Thursday": ["morning", "evening", "afternoon"],
        "Friday": ["morning", "evening", "afternoon"],
        "Saturday": ["morning", "evening", "afternoon"],
        "Sunday": ["morning", "evening", "afternoon"]
    }
```

```
Monday:
  Morning: Employee D, Employee I
  Afternoon: Employee G, Employee B
  Evening: Employee H, Employee C
------------------------------
Tuesday:
  Morning: Employee A, Employee F
  Afternoon: Employee J, Employee E
  Evening: Employee H, Employee C
------------------------------
Wednesday:
  Morning: Employee D, Employee I
  Afternoon: Employee G, Employee B
  Evening: Employee J, Employee E
------------------------------
Thursday:
  Morning: Employee A, Employee F
  Afternoon: Employee G, Employee B
  Evening: Employee H, Employee C
------------------------------
Friday:
  Morning: Employee D, Employee I
  Afternoon: Employee J, Employee E
  Evening: Employee A, Employee F
------------------------------
Saturday:
  Morning: Employee D, Employee I
  Afternoon: Employee G, Employee B
  Evening: Employee H, Employee C
------------------------------
Sunday:
  Morning: Employee A, Employee F
  Afternoon: Employee J, Employee E
  Evening: Employee H, Employee C
------------------------------
```

As you can see above, the scheduler comes up with a schedule for all the employees trying to maximize satisfying the preferences and the required conditions for the schedule (all shifts and days are covered, no employee works multiple shifts a day, no employee works more than 5 days a week). This program also ensures every employee gets more or less an equal number of shifts.