



SYMBIOSIS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

Software Testing and Quality Assurance

Lab Assignment - 6

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Question

Write a program that accepts marks of 20 students of 5 subjects and outputs the average and pass/fail message.

Compute the following:

- a. Draw flow graph
- b. Draw DD graph and connection matrix
- c. Compute cyclomatic complexity
- d. Identify independent paths

Code

```
1 import csv
2 marks = read_csv("/marks.csv")
3 res = []
4 resDummy = []
5 avg = []
6 avgDummy = 0
7 for i in range(20):
8     for j in range(5):
9         avgDummy = avgDummy + marks[i][j]
10        if marks[i][j] < 40:
11            resDummy.append("F")
12        else:    resDummy.append("P")
13    #For Loop End
14    avg.append(avgDummy/5)
15    res.append(resDummy)
16    resDummy = []
17    avgDummy = 0
18 end()
```

Other Information

Marks	[[8, 59, 24, 57, 41], [79, 62, 14, 66, 40], [48, 49, 5, 35, 33], [97, 19, 52, 71, 3], [92, 20, 58, 21, 46], [84, 56, 84, 25, 90], [55, 90, 15, 59, 17], [52, 22, 86, 36, 9], [62, 52, 5, 16, 58], [95, 55, 1, 9, 99], [11, 26, 53, 62, 34], [8, 43, 8, 47, 59], [51, 61, 46, 17, 50], [60, 1, 25, 85, 36], [28, 89, 99, 80, 88], [66, 90, 37, 84, 41], [86, 13, 87, 64, 32], [15, 16, 69, 83, 59], [44, 37, 55, 25, 15], [69, 57, 13, 78, 41]]
Avg. Marks	[37.8, 52.2, 34.0, 48.4, 47.4, 67.8, 47.2, 41.0, 38.6, 51.8, 37.2, 33.0, 45.0, 41.4, 76.8, 63.6, 56.4, 48.4, 35.2, 51.6]
Result:Pass/Fail	[['F', 'P', 'F', 'P', 'P'], ['P', 'P', 'F', 'P', 'P'], ['P', 'P', 'F', 'F', 'F'], ['P', 'F', 'P', 'P', 'F'], ['P', 'F', 'P', 'F', 'P'], ['P', 'P', 'P', 'F', 'P'], ['P', 'P', 'F', 'P', 'F'], ['P', 'F', 'P', 'F', 'F'], ['P', 'P', 'F', 'F', 'P'], ['P', 'P', 'F', 'F', 'P'], ['F', 'F', 'P', 'P', 'F'], ['F', 'P', 'F', 'P', 'P'], ['P', 'P', 'P', 'F', 'P'], ['P', 'F', 'F', 'P', 'F'], ['F', 'P', 'P', 'P', 'P'], ['P', 'P', 'F', 'P', 'P'], ['P', 'F', 'P', 'P', 'F'], ['F', 'F', 'P', 'P', 'P'], ['P', 'F', 'P', 'F', 'F'], ['P', 'P', 'F', 'P', 'P']]

Screenshot



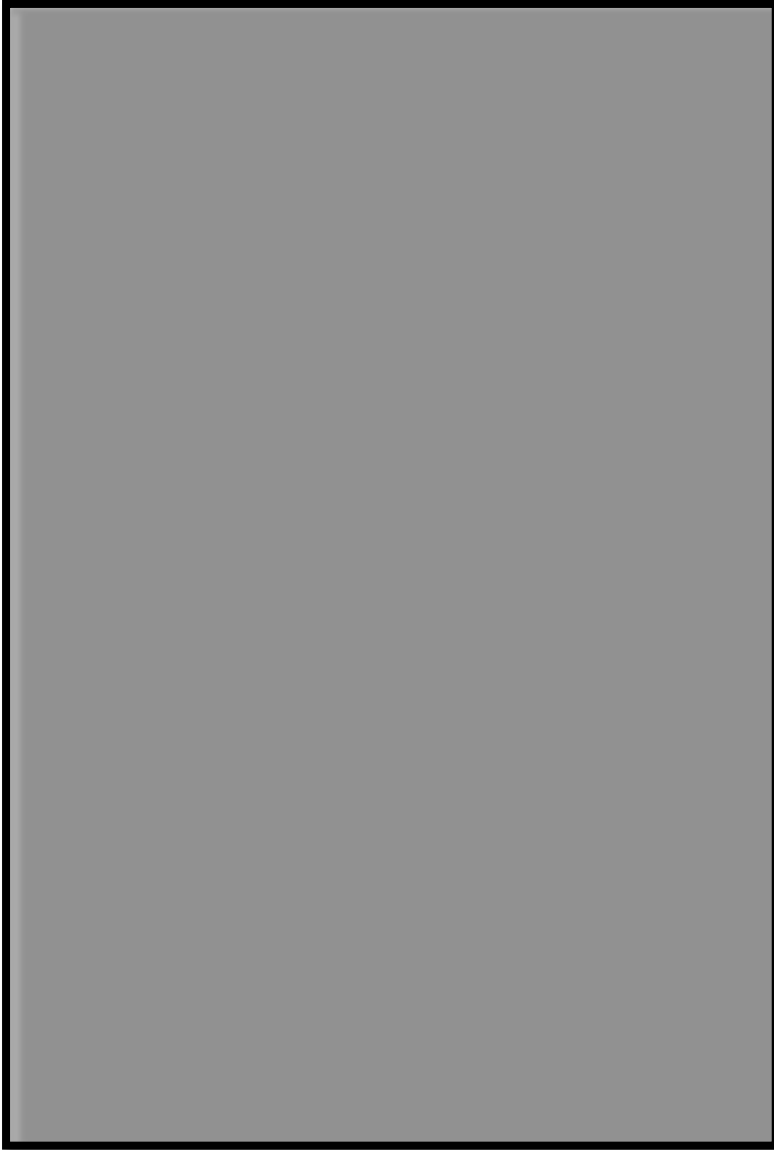
The screenshot displays a Jupyter Notebook window titled "STQA_6.ipynb". The interface includes a top menu bar with options like File, Edit, View, Insert, Runtime, Tools, and Help. Below the menu is a toolbar with icons for Code, Text, Cell, and Cell. The main area shows a Python script with the following code:

```
[17]: 1 import csv
2 marks = read_csv("/marks.csv")
3 res = []
4 resDummy = []
5 avg = []
6 avgDummy = 0
7 for i in range(20):
8     for j in range(5):
9         avgDummy = avgDummy + marks[i][j]
10        if marks[i][j] < 40:
11            resDummy.append("F")
12        else:
13            resDummy.append("P")
14    avg.append(avgDummy/5)
15    res.append(resDummy)
16    resDummy = []
17    avgDummy = 0
18 end()
```

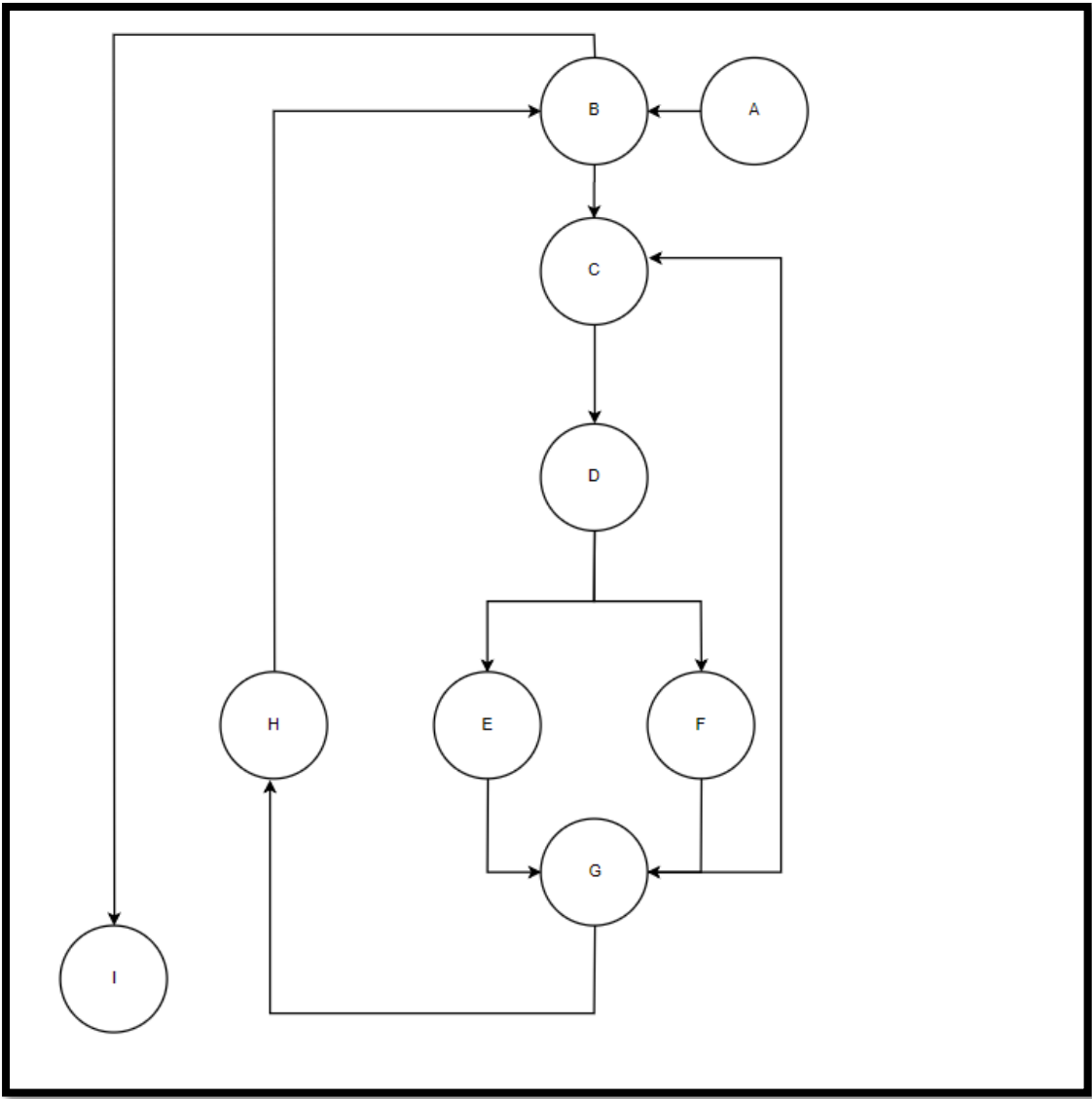
The output of the script is displayed in a cell below the code, showing a list of lists. Each inner list contains 5 elements, which are either 'P' or 'F', representing the results of the script's execution.

```
res
[[['P', 'P', 'F', 'P', 'P'],
 ['P', 'P', 'F', 'P', 'P'],
 ['P', 'P', 'F', 'P', 'P'],
 ['P', 'F', 'P', 'P', 'F'],
 ['P', 'F', 'P', 'F', 'P'],
 ['P', 'P', 'P', 'F', 'P'],
 ['P', 'P', 'P', 'P', 'P'],
 ['P', 'F', 'P', 'F', 'P'],
 ['P', 'P', 'F', 'F', 'P'],
 ['F', 'F', 'P', 'P', 'P'],
 ['F', 'P', 'F', 'P', 'P'],
 ['P', 'P', 'P', 'F', 'P'],
 ['P', 'F', 'F', 'P', 'P'],
 ['F', 'P', 'P', 'P', 'P'],
 ['P', 'P', 'F', 'P', 'P'],
 ['P', 'F', 'P', 'P', 'P'],
 ['P', 'F', 'P', 'P', 'P']]]
```

Flow Graph



Decision Directed Graph



Connection Matrix

	A	B	C	D	E	F	G	H	I
A		1							
B			1						1
C				1					
D					1	1			
E							1		
F		1					1		
G			1					1	
H		1							
I									

Cyclomatic Complexity

The complexity is Number of Simple decisions + 1 = $3+1 = 4$

Independent Paths

1. ABI
2. ABCDEGHBI
3. ABCDFGHBI