

Task implementation

Current project folder has the following files:

- 1 - Task requirements.pdf which has task requirements.
- 2 - Source code of two programs implemented according to task requirements (e.g. projectDemo_v2.py, projectDemo_v3.py).
- 3 - Compiled SH files of two programs. (e.g. projectDemo_v2, projectDemo_v3).
- 4 - demoText.txt file which has input text for both programs.

Brief explanation of source code for first program (projectDemo_v2.py):

1 - First my program reads all data from standard input and stores in data structures by parsing. The first non-empty line where employee IDs are indicated is stored in array. And the rest lines of information are stored in hashmap data structure. I decided to store all the employee attendance information in the hashmap because hashmap stores information in tree-directories.

2 - After reading is finished my program continues by reading all stored information from data structures (e.g. array and hashmap) and outputting them into standard output by doing some calculations like the total count of presence hours of each employee at his workplace.

Brief explanation of source code for second program (projectDemo_v3.py):

1 - My program is consisted of 2 methods: *parent()* and *child()*. The method *parent* reads all data from standard input and stores in data structures by parsing. The first non-empty line where employee IDs are indicated is stored in array. And the rest lines of information are stored in hashmap data structure. I decided to store all the employee attendance information in the hashmap because hashmap stores information in tree-directories.

2 - After reading is finished by method *parent()*, *child()* method is invoked inside parent method by forking as separate process and continues by reading all stored information from data structures (e.g. array and hashmap) and outputting them into standard output by doing some calculations like the total count of presence hours of each employee at his workplace.

Brief explanation of source code compilation into executable:

The programs are written in **Python** programming language and compiled into executable format. To be able to run the python code, you need to have python installed on your machine and version python should be at least **2.7.X**. To compile the source codes into executables, you need to install python library called **PyInstaller**, which can be done by running the following command in the terminal:

```
sudo pip install py2exe
```

Then, if installation of library completes successfully, you can compile the source codes into executable files by running the following commands in the terminal:

```
pyinstaller --onefile --windowed <path_to_source_code>/projectDemo_v2.py  
pyinstaller --onefile --windowed <path_to_source_code>/projectDemo_v3.py
```

Each command above generates 2 folders and one file (e.g. **build**, **dist** and **projectDemo_v2.spec**.) in folder where compiled source code is located (e.g. projectDemo_v2.py or projectDemo_v3.py). All you need is to locate to **dist** folder, inside of which you will find compiled executable file named **projectDemo_v2** and **projectDemo_v3** after compilation respectively. The rest can be deleted.

Steps to show program execution with standard input and standard output:

1.1 – Execute projectDemo_v2.sh in terminal after which it waits for input.

```
altay@altay-pc ~/Desktop $ ./projectDemo_v2
```

1.2 – Copy and paste the sample input into terminal from demoText.txt and press CTRL+D to finish input for projectDemo_v2.sh to output result.

```
altay@altay-pc ~/Desktop $ ./projectDemo_v2
12345 23456 34567 45678 56789 67890
3/14/2016 8:00 12345 23456 34567 67890
3/14/2016 9:00 12345 34567 45678
3/14/2016 10:00 12345 23456 34567
3/14/2016 11:00 12345 23456 34567 45678
3/14/2016 12:00 12345 23456 45678 67890
3/14/2016 13:00 12345 23456 34567 67890
3/14/2016 14:00 12345 23456 34567 45678
3/14/2016 15:00 12345 23456 34567
3/14/2016 16:00 12345 23456 34567 45678
3/14/2016 17:00 12345 23456 34567 45678 67890

3/15/2016 08:00 12345 23456 34567 45671 67890 78901
3/15/2016 09:00 12345 23451 34567 45678 78901
3/15/2016 10:00 12345 23456 34567 45671 78901
3/15/2016 11:00 12345 23456 34567 45678 78901
3/15/2016 12:00 12345 23456 34568 45678 67890
3/15/2016 13:00 12345 23456 34567 45671 67890
3/15/2016 14:00 12345 23456 34567 45678 78901
3/15/2016 15:00 12345 23456 34567 45671 78901
3/15/2016 16:00 12345 23456 34567 45678 78901
3/15/2016 17:00 12345 23456 34567 45678 67890
```

1.3 – Printed output result in terminal.


```
Terminal
3/15/2016 11:00 12345 23456 34567 45678 78901
3/15/2016 12:00 12345 23456 34568 45678 67890
3/15/2016 13:00 12345 23456 34567 45671 67890
3/15/2016 14:00 12345 23456 34567 45678 78901
3/15/2016 15:00 12345 23456 34567 45671 78901
3/15/2016 16:00 12345 23456 34567 45678 78901
3/15/2016 17:00 12345 23456 34567 45678 67890
=====
OUTPUT RESULT
=====
3/14/2016 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 8:00 9:00
12345      Y      Y      Y      Y      Y      Y      Y      Y      Y      Y
23456      Y      Y      Y      Y      Y      Y      Y      Y      Y      N
34567      Y      Y      N      Y      Y      Y      Y      Y      Y      Y
45678      N      Y      Y      N      Y      N      Y      Y      N      Y
56789      N      N      N      N      N      N      N      N      N      N
67890      N      N      Y      Y      N      N      N      Y      Y      N

3/14/2016 12345:10 23456:9 34567:9 45678:6 56789:0 67890:4

3/15/2016 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00
12345      Y      Y      Y      Y      Y      Y      Y      Y      Y      Y
23456      Y      N      Y      Y      Y      Y      Y      Y      Y      Y
34567      Y      Y      Y      Y      N      Y      Y      Y      Y      Y
45678      N      Y      N      Y      Y      N      Y      N      Y      Y
56789      N      N      N      N      N      N      N      N      N      N
67890      Y      N      N      N      Y      Y      N      N      N      Y

3/15/2016 12345:10 23456:9 34567:9 45678:6 56789:0 67890:4
Unexpected worker ID on 3/15/2016 at 08:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 09:00 [ 23451, 78901 ]
Unexpected worker ID on 3/15/2016 at 10:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 11:00 [ 78901 ]
Unexpected worker ID on 3/15/2016 at 12:00 [ 34568 ]
Unexpected worker ID on 3/15/2016 at 13:00 [ 45671 ]
Unexpected worker ID on 3/15/2016 at 14:00 [ 78901 ]
Unexpected worker ID on 3/15/2016 at 15:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 16:00 [ 78901 ]

altay@altay-pc ~/Desktop $
```



2 – Make input from text file and output result to terminal.

```
altay@altay-pc ~/Desktop $ cat demoText.txt | ./projectDemo_v2
=====
OUTPUT RESULT
=====
3/14/2016 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 8:00 9:00
12345      Y      Y      Y      Y      Y      Y      Y      Y      Y      Y
23456      Y      Y      Y      Y      Y      Y      Y      Y      Y      N
34567      Y      Y      N      Y      Y      Y      Y      Y      Y      Y
45678      N      Y      Y      N      Y      N      Y      Y      N      Y
56789      N      N      N      N      N      N      N      N      N      N
67890      N      N      Y      Y      N      N      N      Y      Y      N

3/14/2016 12345:10 23456:9 34567:9 45678:6 56789:0 67890:4

3/15/2016 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00
12345      Y      Y      Y      Y      Y      Y      Y      Y      Y      Y
23456      Y      N      Y      Y      Y      Y      Y      Y      Y      Y
34567      Y      Y      Y      Y      N      Y      Y      Y      Y      Y
45678      N      Y      N      Y      Y      N      Y      N      Y      Y
56789      N      N      N      N      N      N      N      N      N      N
67890      Y      N      N      N      Y      Y      N      N      N      Y

3/15/2016 12345:10 23456:9 34567:9 45678:6 56789:0 67890:4
Unexpected worker ID on 3/15/2016 at 08:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 09:00 [ 23451, 78901 ]
Unexpected worker ID on 3/15/2016 at 10:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 11:00 [ 78901 ]
Unexpected worker ID on 3/15/2016 at 12:00 [ 34568 ]
Unexpected worker ID on 3/15/2016 at 13:00 [ 45671 ]
Unexpected worker ID on 3/15/2016 at 14:00 [ 78901 ]
Unexpected worker ID on 3/15/2016 at 15:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 16:00 [ 78901 ]

altay@altay-pc ~/Desktop $
```

3.1 – Make input from text file and output result to **result.txt** text file

```
altay@altay-pc ~/Desktop $ cat demoText.txt | ./projectDemo_v2 > result.txt
altay@altay-pc ~/Desktop $
```

3.2 - Output in result.txt.

```
result.txt (~/Desktop) - gedit
File Edit View Search Tools Documents Help
Open Save Undo
result.txt x

=====
OUTPUT RESULT
=====
3/14/2016 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 8:00 9:00
12345 Y Y Y Y Y Y Y Y Y Y
23456 Y Y Y Y Y Y Y Y Y N
34567 Y Y N Y Y Y Y Y Y Y
45678 N Y Y N Y N Y Y N Y
56789 N N N N N N N N N N
67890 N N Y Y N N N Y Y N

3/14/2016 12345:10 23456:9 34567:9 45678:6 56789:0 67890:4

3/15/2016 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00
12345 Y Y Y Y Y Y Y Y Y Y
23456 Y N Y Y Y Y Y Y Y Y
34567 Y Y Y Y N Y Y Y Y Y
45678 N Y N Y Y N Y N Y Y
56789 N N N N N N N N N N
67890 Y N N N Y Y N N N Y

3/15/2016 12345:10 23456:9 34567:9 45678:6 56789:0 67890:4
Unexpected worker ID on 3/15/2016 at 08:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 09:00 [ 23451, 78901 ]
Unexpected worker ID on 3/15/2016 at 10:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 11:00 [ 78901 ]
Unexpected worker ID on 3/15/2016 at 12:00 [ 34568 ]
Unexpected worker ID on 3/15/2016 at 13:00 [ 45671 ]
Unexpected worker ID on 3/15/2016 at 14:00 [ 78901 ]
Unexpected worker ID on 3/15/2016 at 15:00 [ 45671, 78901 ]
Unexpected worker ID on 3/15/2016 at 16:00 [ 78901 ]
```