DIT636/DAT560

Assignment 1: Quality and System Testing

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Group 19

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Problem 1 - Quality Scenarios

Requirements

Reliability: the system's failure rate of plane collisions must be 750 million to 1.

Availability: in the event of a system crash, the system can reboot in 5 min.

Performance: in the event of a crash or collision the system must be able to direct all planes in the airport's air space to ground within 20 min or direct them out of it.

Scalability: given sufficient computational power, equivalent to one Intel® Core™ i5 Processors 13th generation per every 20 planes expected to be docked or in the airspace of the airport, the system must be able to operate in any currently existing airport regardless of size.

Security: access to the system must be limited to those with a valid access token and identification.

Scenarios

Reliability

- **Overview**

The system is on the brink of going over legal capacity for the number of aeroplanes in the airports air space.

- **System State**

The system is operating at 99% capacity

- **Environment State**

The airport is at capacity in terms of personnel, travellers and planes grounded and in the air space.

- **External Stimulus**

Another plane nears the airport's airspace and requests permission to land.

- **Required System Response**

Given that the system is at capacity it sets the plane on a route surrounding the airspace until capacity is available. Alternatively it may under worse conditions direct the plane to the nearest airport however such a request would have to be overseen and approved by an operator.

● **Response Measure**

System always enacts this flight path when at 99 percent capacity. No plane is to wait for more than 30 min before landing.

Availability

● **Overview**

The system has shut down due to a power outage in the airport.

● **System State**

The system is without power,

● **Environment State**

Backup generators are available and functioning.

● **External Stimulus**

The backup generators start forcing a system reboot

● **Required System Response**

The system reboots and accesses its own records immediately identifying there was a crash and retrieving and processing all stored flights in its database for flights grounded or in its airspace. Before resuming prior operations.

● **Response Measure**

A reboot should be able to retrieve 99% of records (records of flight paths and planes in or nearing airport) that were active before the forced shutdown.

Performance

● **Overview**

A plane has lost propulsion right after take off.

● **System State**

System is operating within capacity

● **Environment State**

Airport traffic is running normally,

● **External Stimulus**

A flight operator sees the plane has lost propulsion and presses an emergency override requesting that the system puts the airport into lockdown.

● **Required System Response**

The system puts out a no-flight order and orders all planes in air space to leave if they were leaving or remain in the air if they were landing.

● **Response Measure**

The system should never allow planes waiting to land to remain in the air for more than 1 hour unless administration orders otherwise. The flight restriction orders should be sent within 0.1 milliseconds of pressing the override button.

Scalability

- **Overview**

The system will be started for the first time in Guangzhou Baiyun International Airport, China's largest airport.

- **System State**

System has been fitted to communicate with users in Mandarin if not otherwise specified. System has been installed correctly.

- **Environment State**

Proper hardware has been installed with sufficient capacity to handle traffic. The schedule for the day for planes to arrive and leave has been downloaded to the system.

- **External Stimulus**

An operator in the server room turns the system on.

- **Required System Response**

The system runs a diagnostic to ensure all subsystems are operational after which it accesses the schedule and plans the flight plan for all flights. A plan which will be adjusted continuously.

- **Response Measure**

The system will have booted completely within 10 minutes (given that this is a first time boot)

Security

- **Overview**

A pilot attempts to log into the system before take off. While in the cockpit of his assigned plane.

- **System State**

System is running within capacity

- **Environment State**

Pilots are running pre-flight checks before scheduled take off.

- **External Stimulus**

Pilot enters his credentials, password and access token before pressing enter

- **Required System Response**

If all credentials are correct the system will give the pilot access to communications and the planned route including take off time.

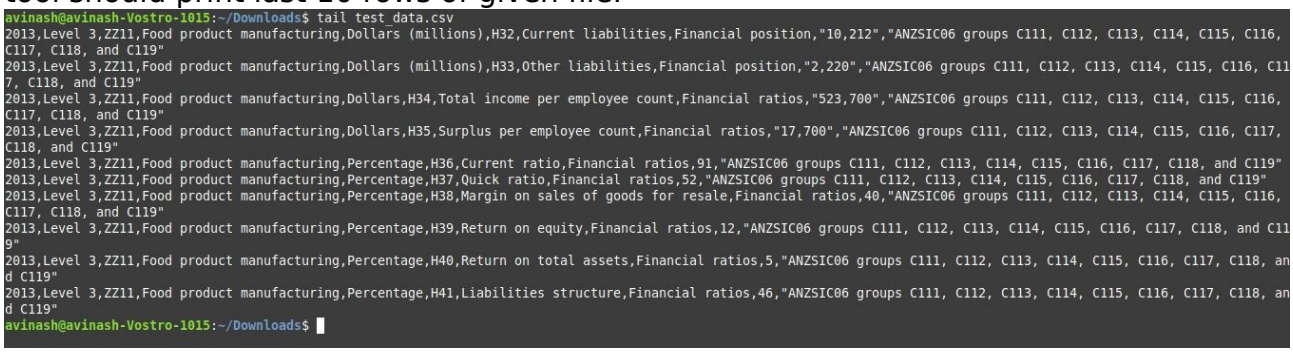
If credentials are incorrect the system will await another login attempt.

- **Response Measure**

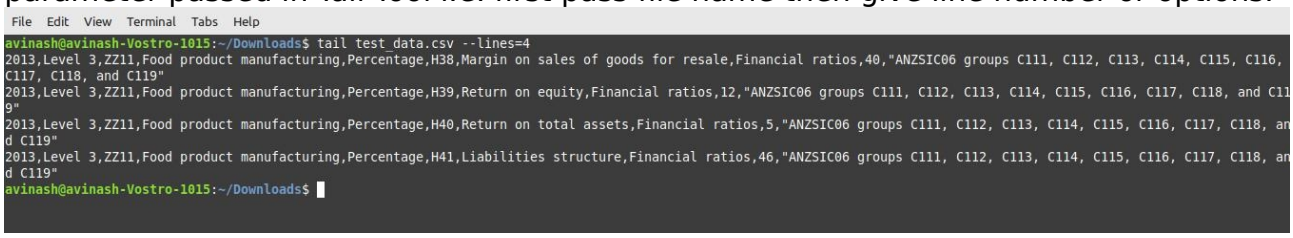
Users are always given access to all systems they have access to (assuming correct credentials) with no greater delay than 2 seconds.

Problem 2 - System Test Design

Test specifications 01: Verify that when user passes only file name then Tail tool should print last 10 rows of given file.



Test specification 02: Verify tool behaviour i.e. if user changes the order of parameter passed in Tail Tool i.e. first pass file name then give line number or options.



Testable Function:

1. This tool read last 10 rows of given file by default (input passed / choices: number of file> 0 / 1, 2, 3 With more than one FILE, precede each with a header giving the file name.

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail --lines=4 --lines=4 test_data.csv test_data2.csv
==> test_data.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H38,Margin on sales of goods for resale,Financial ratios,40,"ANZSIC06 groups C111, C112, C113, C114, C115, C116,
C117, C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"

==> test_data2.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H38,Margin on sales of goods for resale,Financial ratios,40,"ANZSIC06 groups C111, C112, C113, C114, C115, C116,
C117, C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
avinash@avinash-Vostro-1015:~/Downloads$
```

2. If only option is given i.e. no file parameter then it should read standard input.

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail test_data.csv
2013,Level 3,ZZ11,Food product manufacturing,Dollars (millions),H32,Current liabilities,Financial position,"10,212","ANZSIC06 groups C111, C112, C113, C114, C115, C116,
C117, C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Dollars (millions),H33,Other liabilities,Financial position,"2,220","ANZSIC06 groups C111, C112, C113, C114, C115, C116, C11
7, C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Dollars,H34,Total income per employee count,Financial ratios,"523,700","ANZSIC06 groups C111, C112, C113, C114, C115, C116,
C117, C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Dollars,H35,Surplus per employee count,Financial ratios,"17,700","ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117,
C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H36,Current ratio,Financial ratios,91,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H37,Quick ratio,Financial ratios,52,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H38,Margin on sales of goods for resale,Financial ratios,40,"ANZSIC06 groups C111, C112, C113, C114, C115, C116,
C117, C118, and C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
avinash@avinash-Vostro-1015:~/Downloads$
```

3. If file is empty then it should read standard input.

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail empty_file
avinash@avinash-Vostro-1015:~/Downloads$
```

4. When tail tool will give error (like file does not exist,max size error,.exe file etc)

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail nofile
tail: cannot open 'nofile' for reading: No such file or directory
avinash@avinash-Vostro-1015:~/Downloads$
```

5. Checking tool with finite set 0<n<12 and infinite set n>0
6. Data type of options like number,--f,--v,-q.
7. File manipulation like rename, remove, create.
8. Check performance after giving 10 files or more.

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail --lines=1 1.csv 2.csv 3.csv 4.csv 5.csv 6.csv 7.csv 8.csv 9.csv 10.csv
==> 1.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 2.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 3.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 4.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 5.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 6.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 7.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 8.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 9.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"

==> 10.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C119"
avinash@avinash-Vostro-1015:~/Downloads$
```

9.Try to give negative number and see how system behaves.

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail --lines=-3 test_data.csv
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
avinash@avinash-Vostro-1015:~/Downloads$
```

10. Try to give two options with 1 file.

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail --lines=2 --lines=3 test_data.csv
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
avinash@avinash-Vostro-1015:~/Downloads$
```

11.Try to give two options and two file using -q.

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail -q --lines=2 --lines=3 test_data.csv test_data2.csv
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
avinash@avinash-Vostro-1015:~/Downloads$
```

12. Try to give two options and two files without using -q option.

```
File  Edit  View  Terminal  Tabs  Help
avinash@avinash-Vostro-1015:~/Downloads$ tail --lines=2 --lines=3 test_data.csv test_data2.csv
==> test_data.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"

==> test_data2.csv <==
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H39,Return on equity,Financial ratios,12,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, and C11
9"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H40,Return on total assets,Financial ratios,5,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
2013,Level 3,ZZ11,Food product manufacturing,Percentage,H41,Liabilities structure,Financial ratios,46,"ANZSIC06 groups C111, C112, C113, C114, C115, C116, C117, C118, an
d C119"
avinash@avinash-Vostro-1015:~/Downloads$
```

Choices, representative values, and constraints.
• Choices: What you can control when testing.
• Representative Values: Logical options for each choice i.e. provide abstract type of input like n>0 and <size of file.
• Constraints: Limit certain combinations of values.(if, error,single).

Explicit Parameter: Options and File.
Environmental considerations: contents and existence of the file

Parameter: Options

-bytes=K

-follow[={name or descriptor}]
-F
--lines=K
-max-unchanged-stats=N
--pid=PID
--quiet
--retry
--sleep-interval=N
--verbose
--help
--version

Parameter : File

1. 0 ,1 or more than one file given.
2. Rename the file.
3. Remove the file and try to track.
4. Type of file i.e. txt, csv, pdf.
5. Existence of file i.e. exists, does not exists.
6. Content of file empty or Non empty, Size of file.

Option1	Option2	Option3	File1	File2	File3	Outcome
-lines=+K	-	-	test_data.csv	-	-	Output the last K lines.
-lines=K	-lines=L	-	test_data.csv	-	-	Output the last L lines, it will override the first options.
-lines=K	-lines=L	-	test_data.csv	log.txt	-	Output the last L lines for both file precede each with a header giving the file name.
-q	--lines=K	-	File1.csv	File2.csv	-	Print last K lines of both files without giving file name header.
-F	--retry	-	Does not exist	-	-	Retry to find the file which is not existing.

--help	-	-	-	-	-	Shows usage and commands of Tail.
--version	-	-	-	-	-	Shows tail version.