Liaison XL Internal Log Analyzer Tool User Guide (Version 1.0)

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1. INTRODUCTION

The purpose of the XL Log Analyzer tool is to enable shift supervisors and lab managers to track the error performance of the Liaison XL analyzers in their labs.

Medical technologists or shift supervisor can collect the event logs from XL instruments at certain time intervals and apply the tool to generate reports on errors observed on the instrument.

Shift supervisors can quantitatively compare the performance of each analyzer to detect discrepancies in terms of error/failure rates on a weekly or a daily basis, and can take action accordingly to reduce failures on these instruments.

The tool focuses on outputting significant and critical errors that have impact on reagent consumption such as “Reagent Integrity Errors (RIEs)” , “Sample Integrity Errors (SIEs)”, “ Target Not Reached (TNR)” errors and other Mechanical Errors that cause “Aborted Jobs”, and hence reagent waste.

The rest of this document describes step-by-step how to use this tool.

2. USER INSTRUCTIONS

2.1 Collecting Log Files from the Analyzer

The daily log files stored in the analyzer should be collected from the analyzer using a USB thumb drive and copied in to your Windows computer.

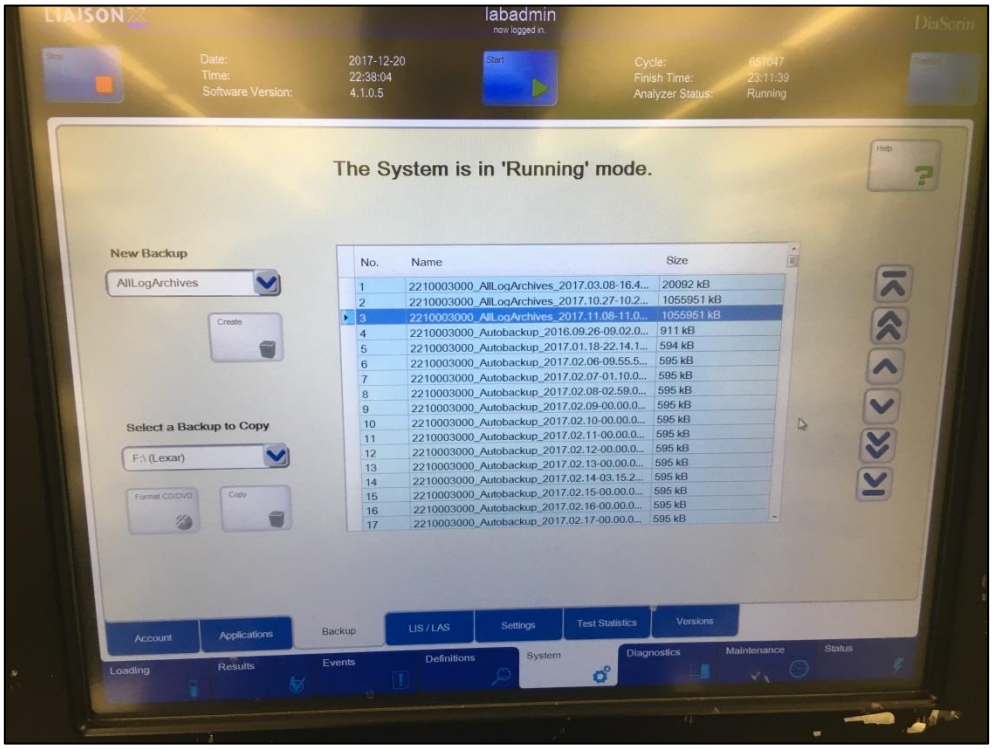
An example log file is attached here:

LogFile_2017-06-01.txt

The following steps describe how to transfer log files from the analyzer to your computer:

Step-1: Plug the USB thumb drive into the analyzer (using any of the available USB ports on the analyzer) as shown in the picture below,

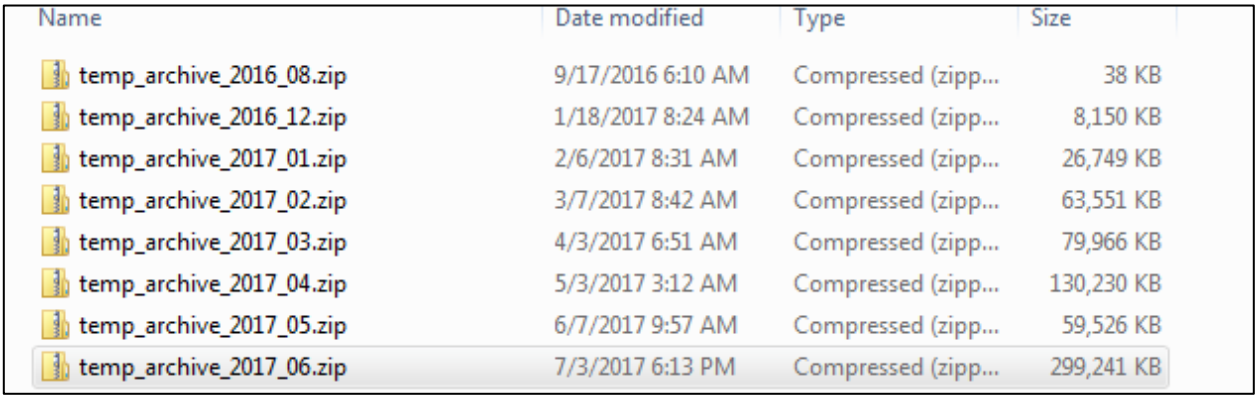
Step-2: On the analyzer screen, go to "System"→ "Backup" tab to write a copy of the AllLogArchives" file to the USB Thumb Drive .
Select F: Drive as the target drive to copy the logs archive file file.



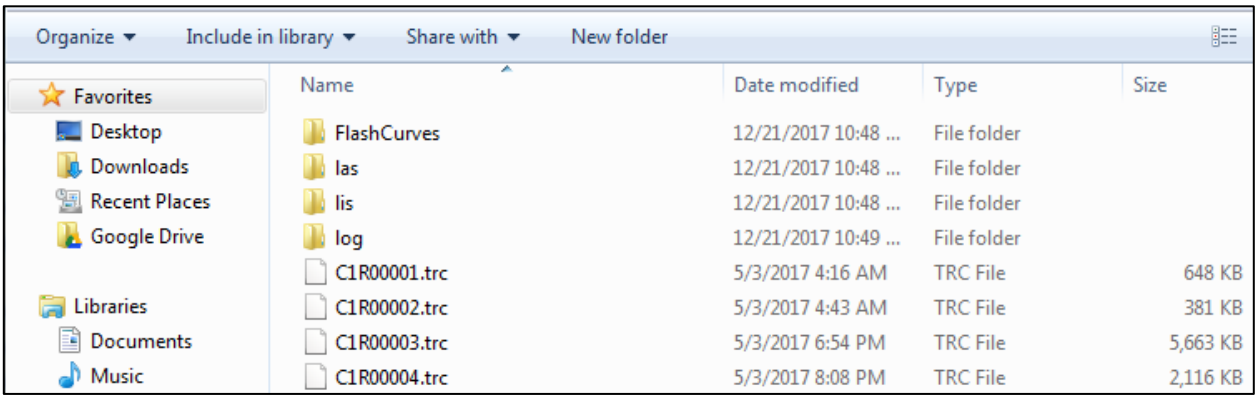
Step-3: Plug the USB Thumb Drive to your computer and copy the "AllLogArchives" zip file to any folder of your choice in your computer and unzip the file.

Step-4: In the extracted folder, you will see temp_archive zip files in the format of "temp_archive_yyyy_mm.zip" that contain daily log files for the instrument for the year: "yyyy" and the monh: "mm".

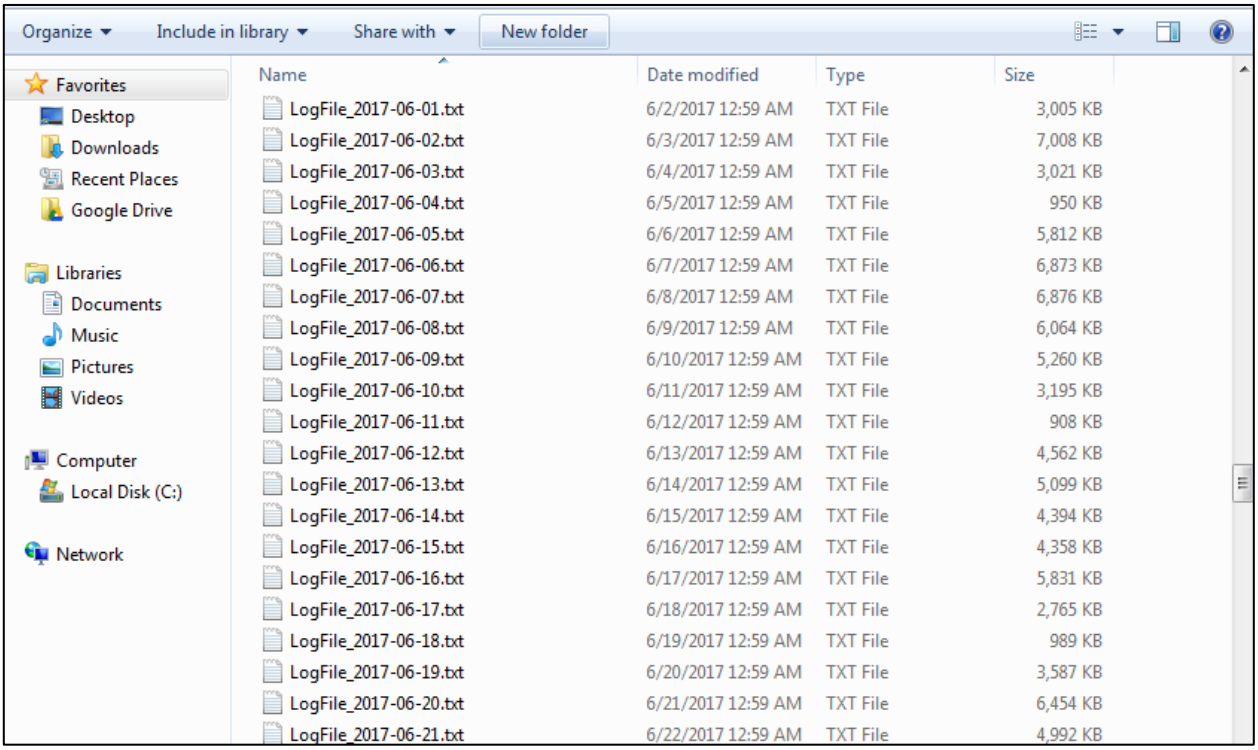
An example screenshot is below:



Step-5: Select the Temp Archive zip file of the target month you want to analyze and unzip it. After unzipping, you should be able to see the following folders in the extracted folder:



Step-5: Go to "log" folder where daily log files ("LogFile_yyyy_mm_dd.txt)" are stored.
Select the files for the target time period you are interested in and copy them into a folder of your choice in your desktop. An example screenshot is below.

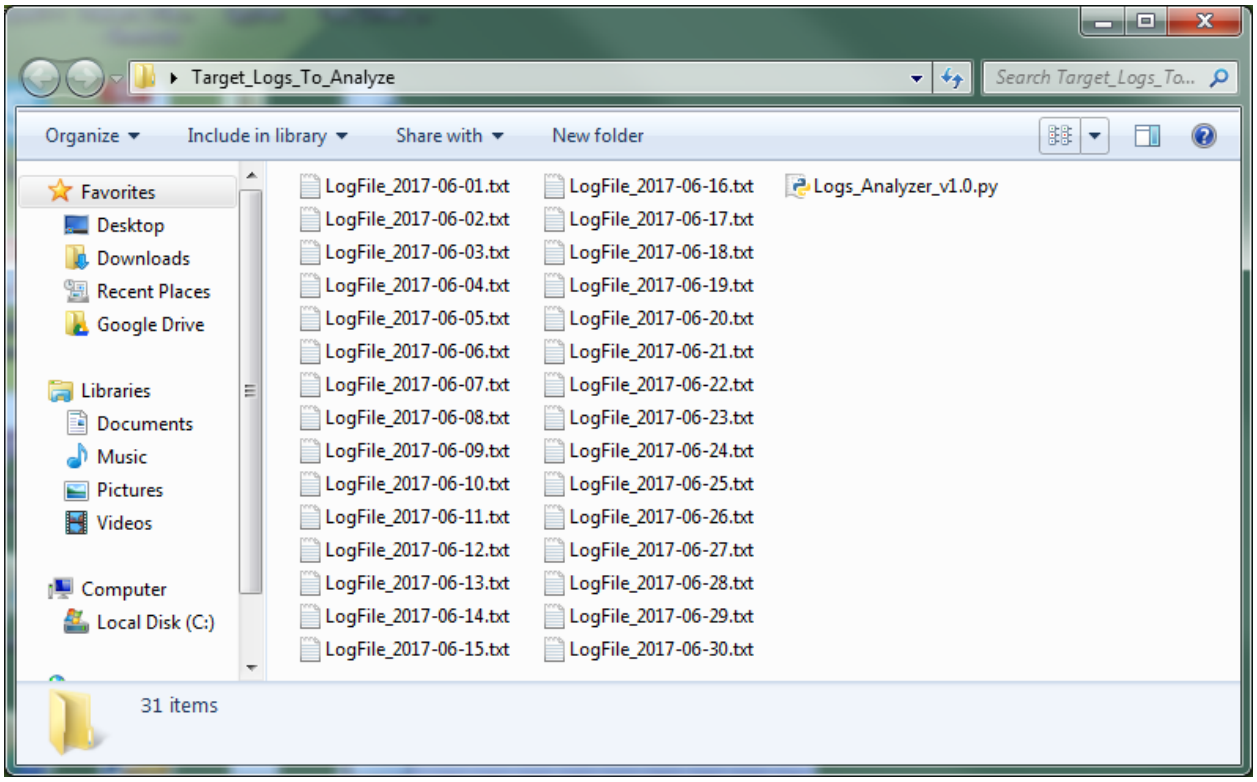


After this step, you should be ready to run the Log Analyzer Tool on the target log files of you selected. The step-by-step procedure to run the Log Analyzer Tool on the selected log files is described in the next section

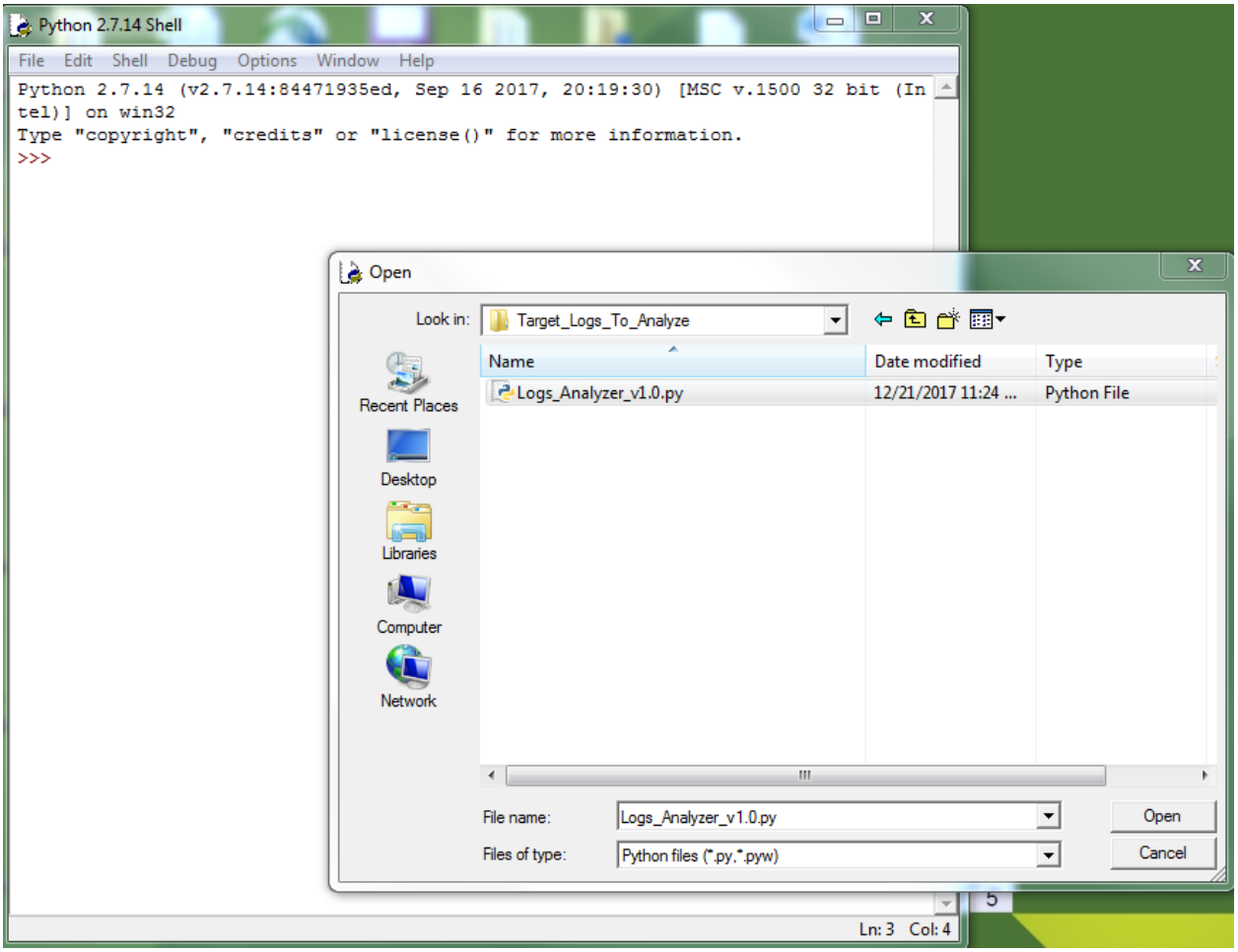
2.2 Running the Analyzer Tool on the Selected Log Files

Step-1: Place the Logs_Analyzer_v1.0.py file into the same folder where your target log files are located.

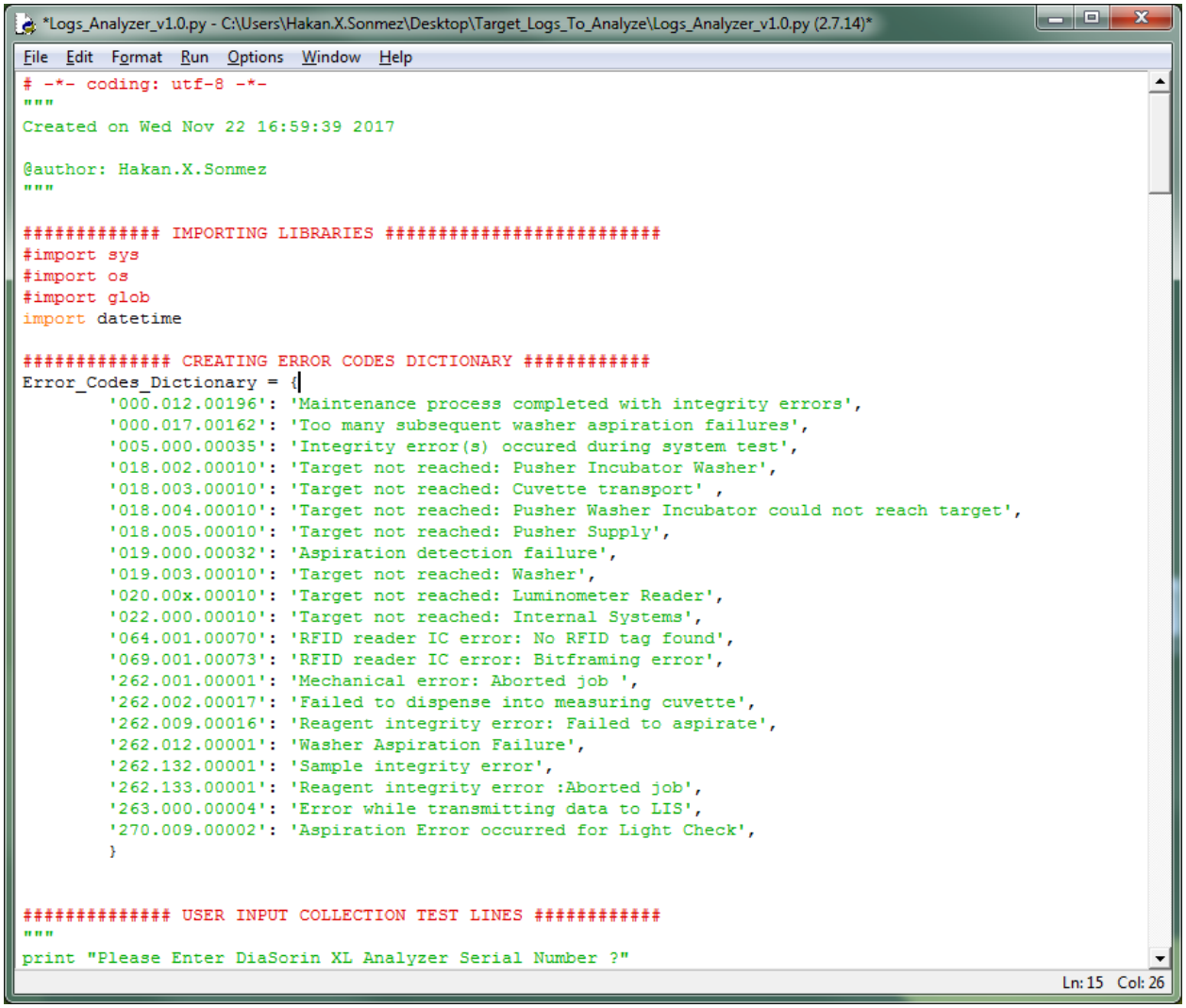
In the example screenshot below, Log Files from 2017-06-01 to 2017-06-30 from the analyzer are placed in a folder named "Targets_Logs_To_Analyze" and the "Logs_Analyzer_v1.0.py" file is also placed in the same folder.



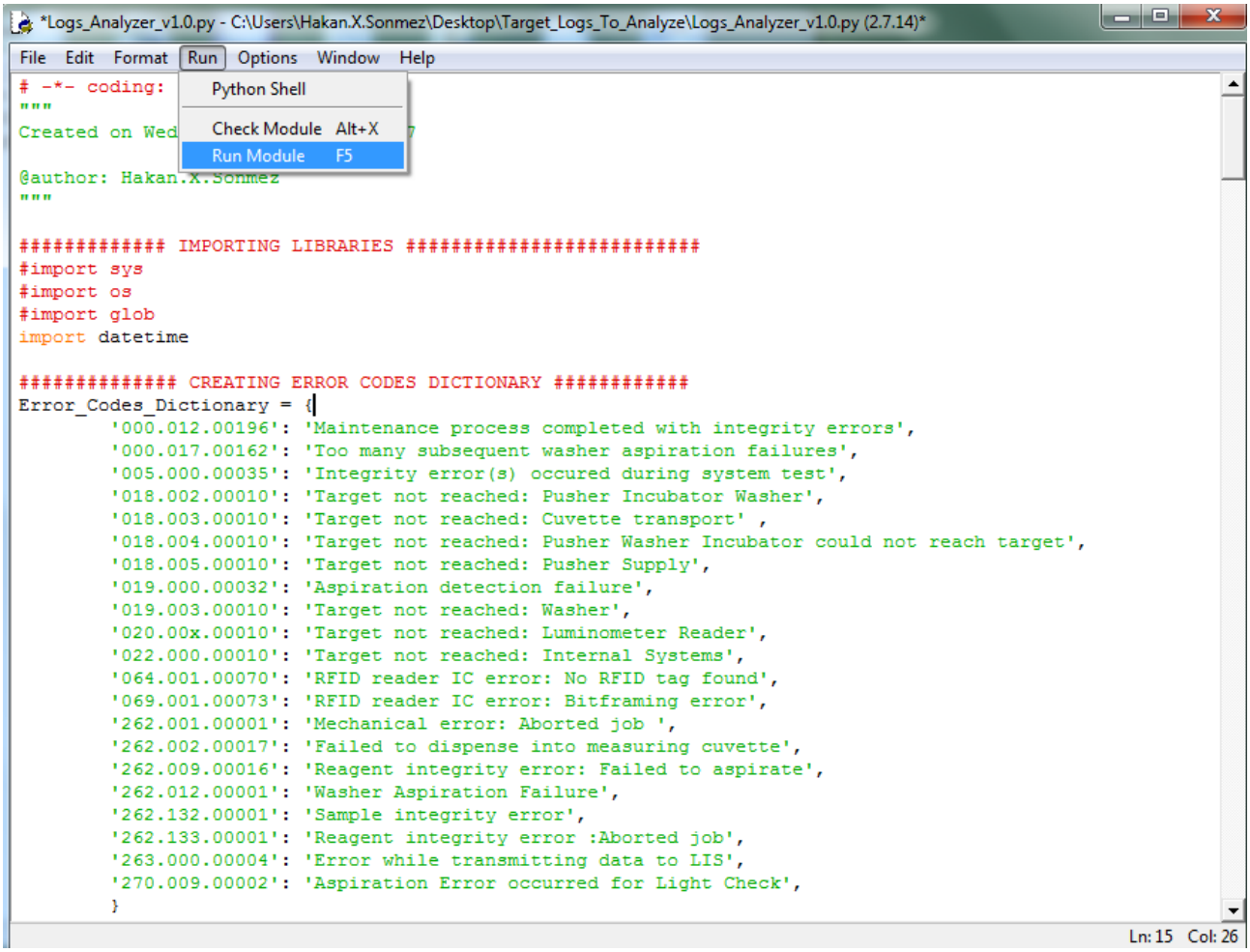
Step-2: Launch Python Python GUI on your Windows computer as described in the section 4.1. Python Installation of this document.
Go to File → Open and select the Log_Analyzer_v1.0.py to open on the Python GUI screen as shown in the next step.



Step-3: After you open the Log_Analyzer_v1.0.py , you should see the Python script loaded on the Python GUI screen as seen below:



Step-4: Go to Run → Run Module icon to run the script as shown in the screenshot below. The script will automatically run on all the Log Files located within the folder and generate XL Logs Analyzer Report on the screen without any further user intervention as shown in the next step.



Step-5: The script will output XL Logs Analyzer Report on the screen without any further user intervention. This may take couple of minutes depending on the number of logs files you are analyzing. An example report output is shown below.

The next section will describe how to interpret the report output.

2.3. Output Report Interpretation

The section will provide explanation for what each field on the output report describes. The text output of a sample run is included below for reference.

- ***Report Generation Date****:* This field is the date the report is generated
- ***Log Analysis Completed For the Dates between:*** The Python script automatically detects the date of the earliest and the latest log files in the target folder, and outputs the time period analyzed. Users are recommended to put consecutive days of log files as the input otherwise the information displayed in this field may not be accurate.
- ***The number of Days (Log Files) Analyzed***: This field outputs the total number of days (i.e. log files) analyzed in this run.

```
================================================================================================
                                        XL LOGS ANALYZER REPORT
REPORT GENERATION DATE: 2017-12-21
Log Analysis Completed For the Dates between: 2017.06.01 and 2017.06.30
Number of Days (Log Files) Analyzed= 30 days

ERROR COUNTS SUMMARY

CRITICAL ERRORS WITH IMPACT ON REAGENT WASTE:

Event ID      :  Error Description:       Error Count=
--------      :  -----------------        -----------
262.009.00016 :  REAGENT INTEGRITY ERROR: Failed to aspirate Errors Found=  113
262.133.00001 :  REAGENT INTEGRITY ERROR: Aborted job Errors Found=  42
262.132.00001 :  SAMPLE INTEGRITY ERRORS Found=  74
018.004.00010 :  TARGET NOT REACHED: Pusher Washer Incubator could not reach target Errors Found=  2
262.001.00001 :  MECHANICAL ERROR: Aborted job Errors Found=  199

NON-CRITICAL ERRORS:
Event ID      :  Error Description:       Error Count=
--------      :  -----------------        -----------
064.001.00070 :  RFID reader IC error: No RFID tag found Errors Found=  225
262.002.00017 :  Failed to dispense into measuring cuvette Errors Found=  56
263.000.00004 :  Error while transmitting data to LIS Errors Found=  135
069.001.00073 :  RFID reader IC error: Bit framing error Errors Found=  16
270.009.00002 :  Aspiration Error occurred for Light Check Errors Found=  11
019.000.00032 :  Aspiration detection failure Errors Found=  11
262.012.00001 :  Washer Aspiration Failure Errors Found=  7
000.012.00196 :  Maintenance process completed with integrity Errors Found=  2
000.017.00162 :  Too many subsequent washer aspiration failures Errors Found=  3
005.000.00035 :  Integrity error(s) occurred during system test Errors Found=  2

SUMMARY OF REAGENT INTEGRITY ERRORS:

Reagent Integrity Error: Failed to aspirate (Event ID:262.009.00016) Errors Found: 113
Description: A reagent integrity error occurred.
Action: 1.Check the reagent vials 2.Start the job again 3.If the problem persists, call service to
check XL system

Reagent Integrity Error: Aborted job (Event ID:262.133.00001) Errors Found: 42
Description: A reagent integrity error occurred.
```

```
Action: 1.Check the reagent vials 2.Start the job again 3.If the problem persists, call service to
check XL system

SUMMARY OF SAMPLE INTEGRITY ERRORS:

Sample Integrity Error: Aborted job (Event ID:262.132.00001) Errors Found: 74
Description: A reagent integrity error occurred.
Action: 1.Check the sample for anomalies 2.Start the job again 3.If the problem persists, call
service to check XL system

SUMMARY OF MECHANICAL ERRORS:

Mechanical Error: Aborted job (Event ID:262.001.00001)Errors Found: 199
Description: A problem with the movements of mechanical subassemblies has occurred.
Action: Check the Liaison XL system about jammed cuvettes or disposable tips. 2. If possible, start
job again. 3. Call service to check the mechanical subassemblies of Liaison XL system.
```

- ***Error Counts Summary:*** Under this section, the Critical Errors with direct impact on reagent waste and Non-critical errors are summarized.

  Note: The report displays the counts only for the errors detected in the analyzed logs. In other words, it does not display zeros (0) for the error codes that are not detected in the analyzed logs.

- ***Event ID and Error Description:*** Event IDs (Error Codes) and Error Descriptions are defined in the "DiaSorin LIAISON® XL User Manual - Revision C" available to operators.

```
ERROR COUNTS SUMMARY

CRITICAL ERRORS WITH IMPACT ON REAGENT WASTE:

Event ID      :  Error Description:       Error Count=
--------      :  ------------------        -----------
262.009.00016 :  REAGENT INTEGRITY ERROR: Failed to aspirate Errors Found=  113
262.133.00001 :  REAGENT INTEGRITY ERROR: Aborted job Errors Found=  42
262.132.00001 :  SAMPLE INTEGRITY ERRORS Found=  74
018.004.00010 :  TARGET NOT REACHED: Pusher Washer Incubator could not reach target Errors Found=  2
262.001.00001 :  MECHANICAL ERROR: Aborted job Errors Found=  199

NON-CRITICAL ERRORS:
Event ID      :  Error Description:       Error Count=
--------      :  ------------------        -----------
064.001.00070 :  RFID reader IC error: No RFID tag found Errors Found=  225
262.002.00017 :  Failed to dispense into measuring cuvette Errors Found=  56
263.000.00004 :  Error while transmitting data to LIS Errors Found=  135
069.001.00073 :  RFID reader IC error: Bit framing error Errors Found=  16
270.009.00002 :  Aspiration Error occurred for Light Check Errors Found=  11
019.000.00032 :  Aspiration detection failure Errors Found=  11
262.012.00001 :  Washer Aspiration Failure Errors Found=  7
000.012.00196 :  Maintenance process completed with integrity Errors Found=  2
000.017.00162 :  Too many subsequent washer aspiration failures Errors Found=  3
005.000.00035 :  Integrity error(s) occurred during system test Errors Found=  2
```

3. REFERENCES

1. DiaSorin LIAISON® XL User Manual - Revision C

All errors codes available to operators, their descriptions and the suggested actions are included in the Liaison XL User Manual document under the Chapter "9. Troubleshooting and Error Messages"

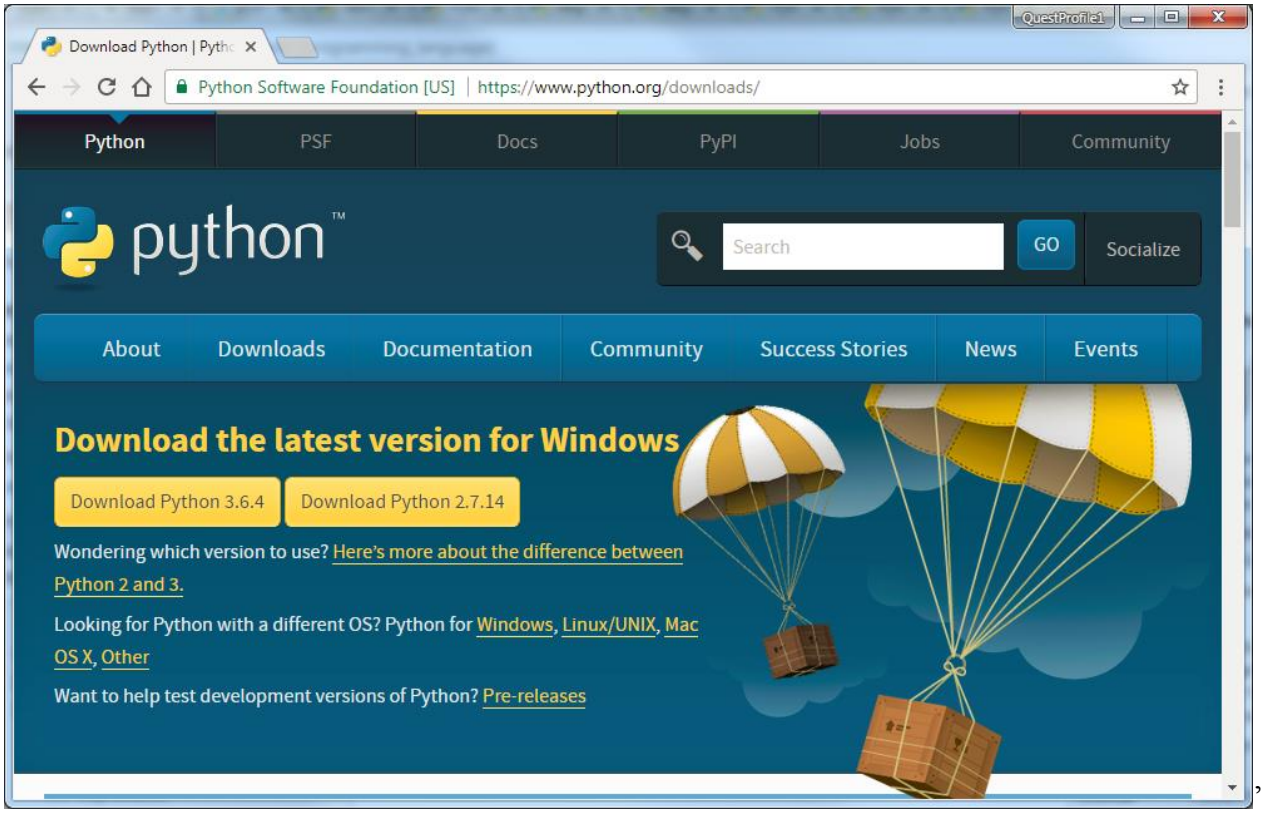
2. DiaSorin LIAISON® Infectious Disease Assay Best Practices Document

4. APPENDIX: PYTHON INSTALLATION AND ENVIRONMENT SETUP

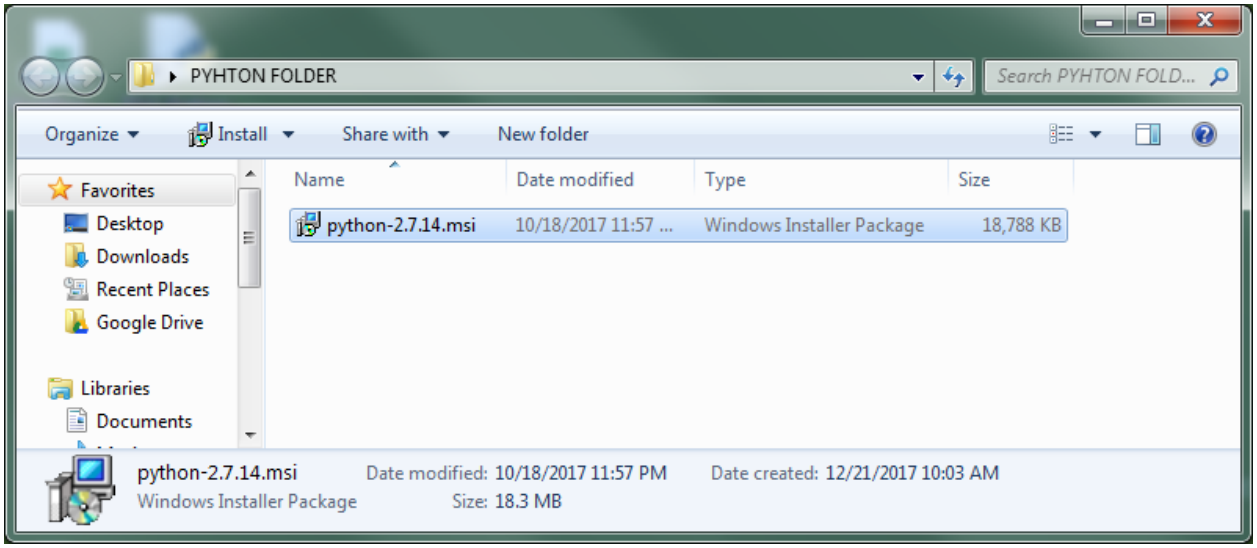
This tool is written using Python (version 2.7.14) software language. Python coding language is developed under an OSI-approved open source license, making it freely usable and distributable for commercial use. The Python software tool is free to download from the following website of the Python Software Foundation:

https://www.python.org/downloads/

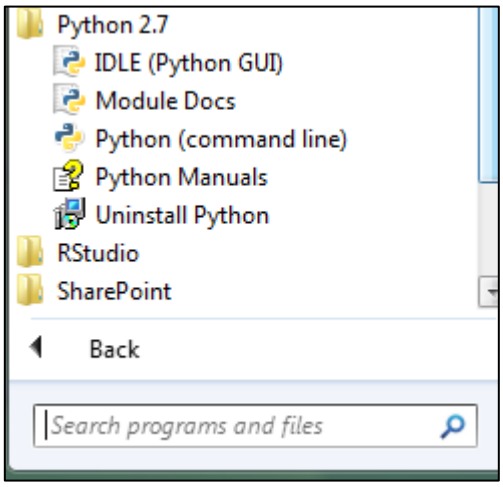
Step-1: Click on "Download Python 2.7.14" version to start downloading the Windows installation file: "python-2.7.14.msi" to any folder of your choice on your Windows computer.



Step-2: Click on the "python-2.7.14.msi" file to start installation of the Python and follow the installation instructions on the screen. The installation should take less than 3 minutes.

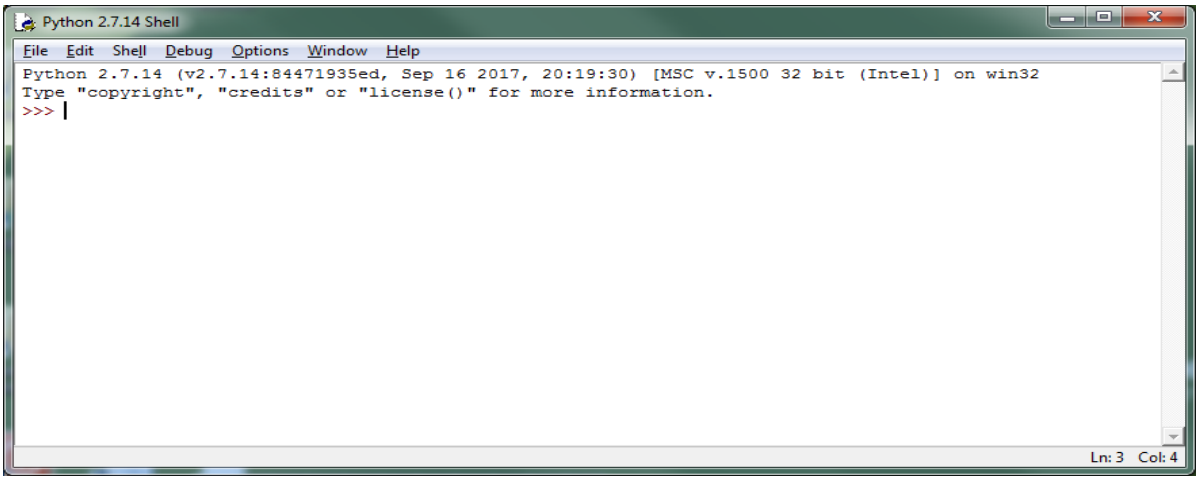


Step-3: After installation, you should be able to see Python Icons under Start Menu >Programs and on your desktop.

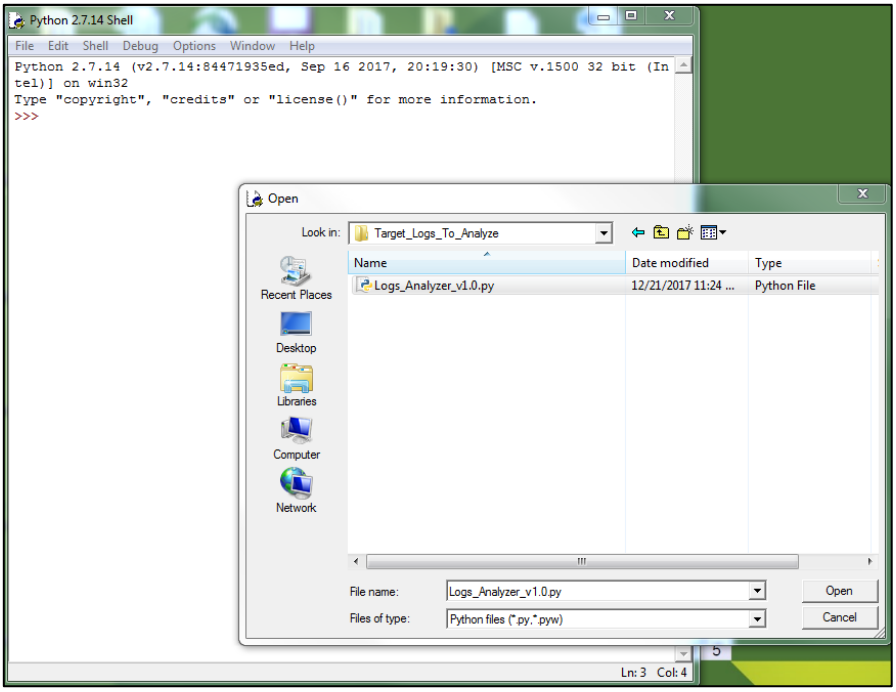


This verifies that the Python program is successfully installed and ready to use at this point.

Step-4: Click on " IDLE (Python GUI) " icon to launch the graphical user Interface.



Step-5: You can go to File→Open… menu to open the target Python script and load it on your Graphical User Interface.



After this point, you can refer to the section "2.2 Running the Analyzer Tool on The Selected Log Files" of this document to run the selected Python script.