

PYTHON GUI executable tool
to generate TOC using RTF files
in various formats (RTF, DOCX,
PDF with bookmark)

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Agenda

- Introduction
- About the tool
- TOC process
 - Index page creation
 - Concatenate all RTF files
 - DOCX/PDF creation
 - PDF bookmark creation
- Key PYTHON packages
- Limitations



Introduction

- Several methods available to generate TOC file
- Most of the methods use bookmark/hyperlink – RTF features to extract the titles
- This tool extracts the titles using the keywords to start with “Table”, “Listing”, “Figure” and “Appendix”(first occurrence) on header section of the SAS-generated RTF files
- Output formats – RTF, DOCX and PDF (with bookmark/without bookmark)
- It’s a single click executable(.exe) PYTHON based – GUI tool
- It’s an independent application that works in both Windows and Unix environments



About the tool

The screenshot shows the 'Table of Contents Generator' application window. It features a settings panel with the following controls:

- Output Format:** A dropdown menu set to 'RTF'.
- PDF Bookmark:** An unchecked checkbox.
- No. of Title Lines:** A dropdown menu set to '3'.
- RTF Files Path:** A text input field containing 'C:/Sathish/Projects/X/'. To its right is a green button labeled 'RTF Path'.
- TOC File Name:** A text input field containing 'TOC_2023-01-23'. To its right is a small text label '(.rtf/.docx/.pdf)'.
- Buttons:** A green 'Generate TOC' button and a green 'Clear Details' button.

Below the settings panel is a table listing selected RTF files:

Select	S.No	RTF Files
☒	1	T01_01_demog.rtf
☒	2	T01_02_dispo.rtf
☒	3	T01_03_mh.rtf
☒	4	T01_04_01_react_a.rtf
☒	5	T01_04_02_react_b.rtf
☒	6	T01_04_03_react_c.rtf
☒	7	T01_04_04_01_fever.rtf
☒	8	T01_04_04_02_report1442.rtf
☒	9	T01_04_04_03_report1443.rtf

Blue arrows point from the following text descriptions to the corresponding UI elements in the screenshot:

- From 'Contains the final TOC output format.' to the 'Output Format' dropdown.
- From 'Used to create a PDF bookmark in the PDF TOC output.' to the 'PDF Bookmark' checkbox.
- From 'Contains the values from 2 to 6. Used to extract the corresponding number of title lines from the RTF outputs.' to the 'No. of Title Lines' dropdown.
- From 'RTF outputs folder path. User can navigate and select RTF folder.' to the 'RTF Path' button.
- From 'The final generated TOC file name.' to the 'TOC File Name' input field.
- From 'Selected folder RTF files are listed here. User may select or unselect based on their interest.' to the table of RTF files.

Contains the final TOC output format.

Used to create a PDF bookmark in the PDF TOC output.

Contains the values from 2 to 6. Used to extract the corresponding number of title lines from the RTF outputs.

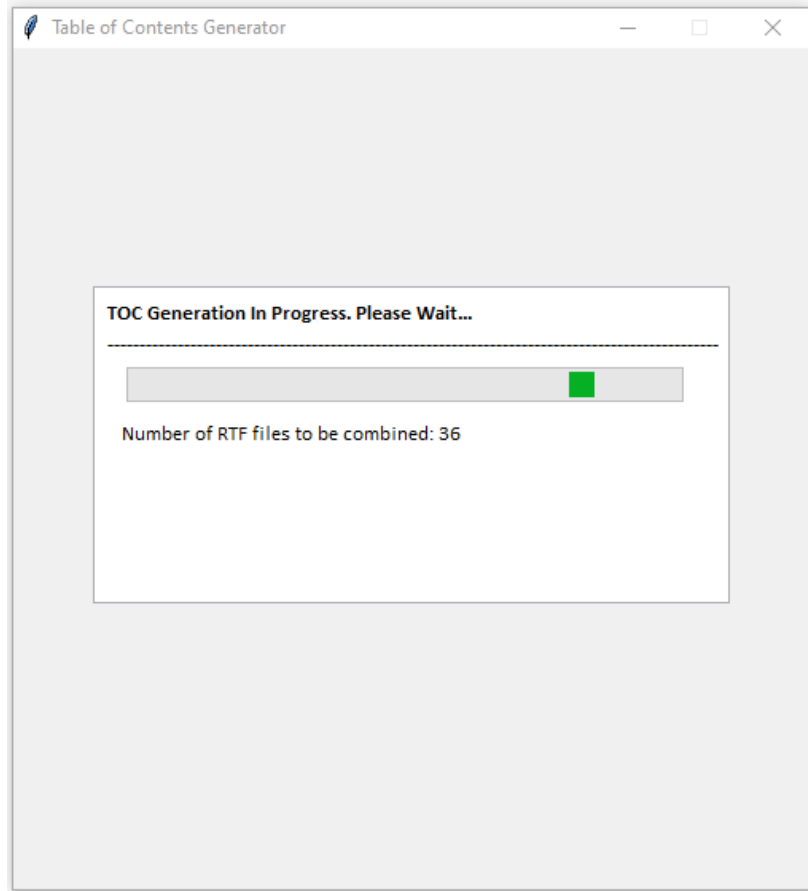
RTF outputs folder path. User can navigate and select RTF folder.

The final generated TOC file name.

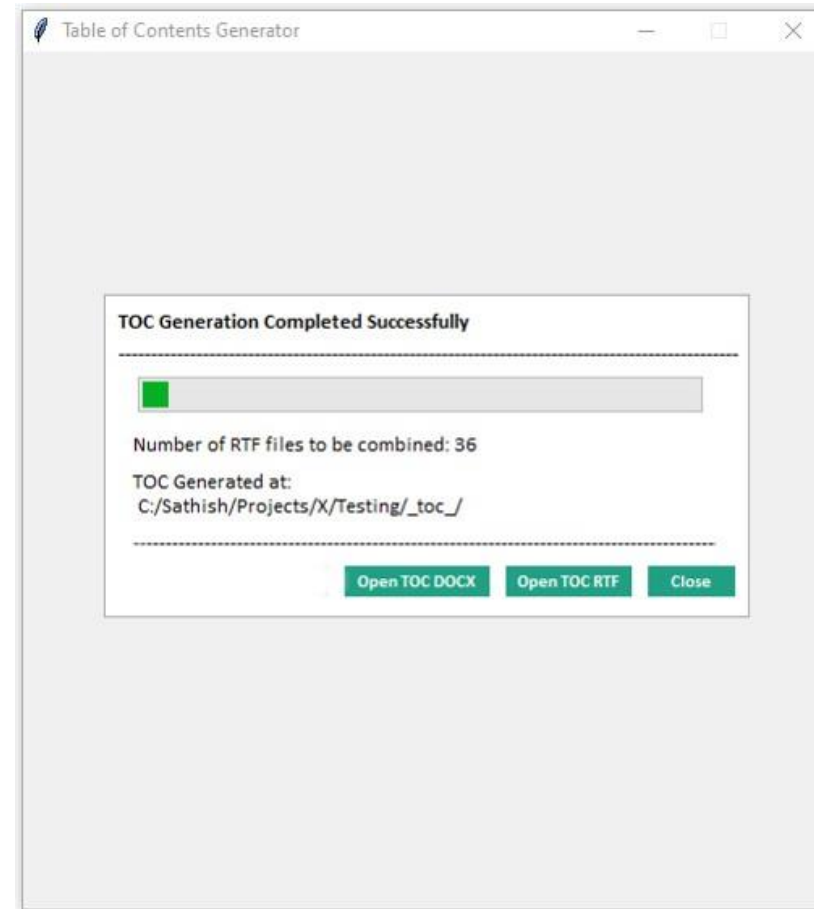
Selected folder RTF files are listed here. User may select or unselect based on their interest.

About the tool (contd.)

While executing



Execution completed



TOC process

TOC Index Page

Combine all RTFs with Index

Convert RTF to DOCX/PDF (based on user selection)

PDF Bookmark (based on user selection)

TOC process – Index page

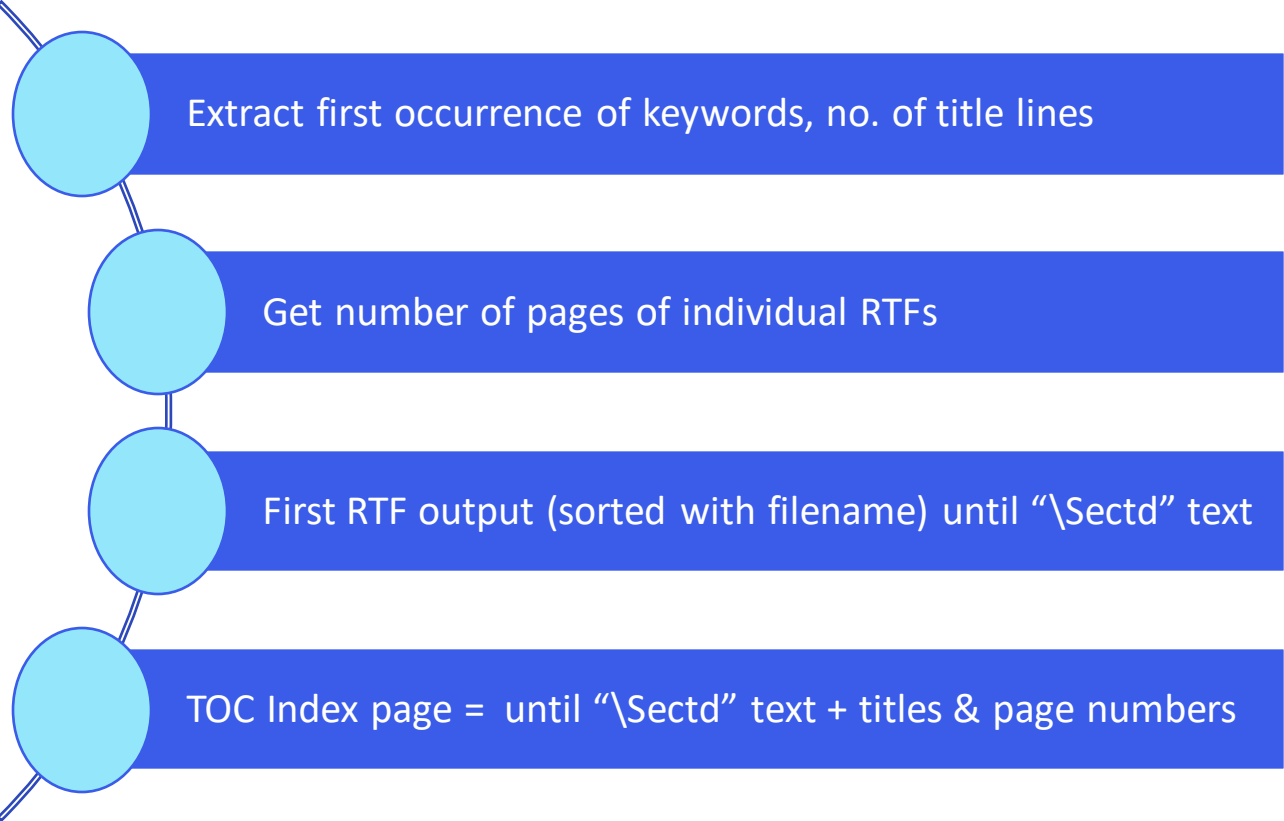


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TOC process – Index page (contd.)

To find the first occurrence of title from RTF outputs

```
if (textline.find("Table ") > -1 or textline.find("Listing ") > -1 or
textline.find("Figure ") > -1 or textline.find("Table\\~") > -1 or
textline.find("Listing\\~") > -1 or textline.find("Figure\\~") > -1 or
textline.find("Appendix ") > -1 or textline.find("Appendix\\~") > -1)
and titleindex == False:
    nline = 1
    titleindex = True
    title = ""
nline = nline + 1
if titleindex == True and nline > 0 and nline <= (self.titlelines+1):
    title = title + " " + textline
```

To get number of pages of individual RTF file

```
no_of_lines = 0
for textline in f.readlines():
    no_of_lines += 1
    if textline.find("\\sectd") > -1 and totla_no_lines != no_of_lines:
        totalpage = totalpage + 1
self.file_pages[filein] = totalpage
```



TOC process – Index page (contd.)

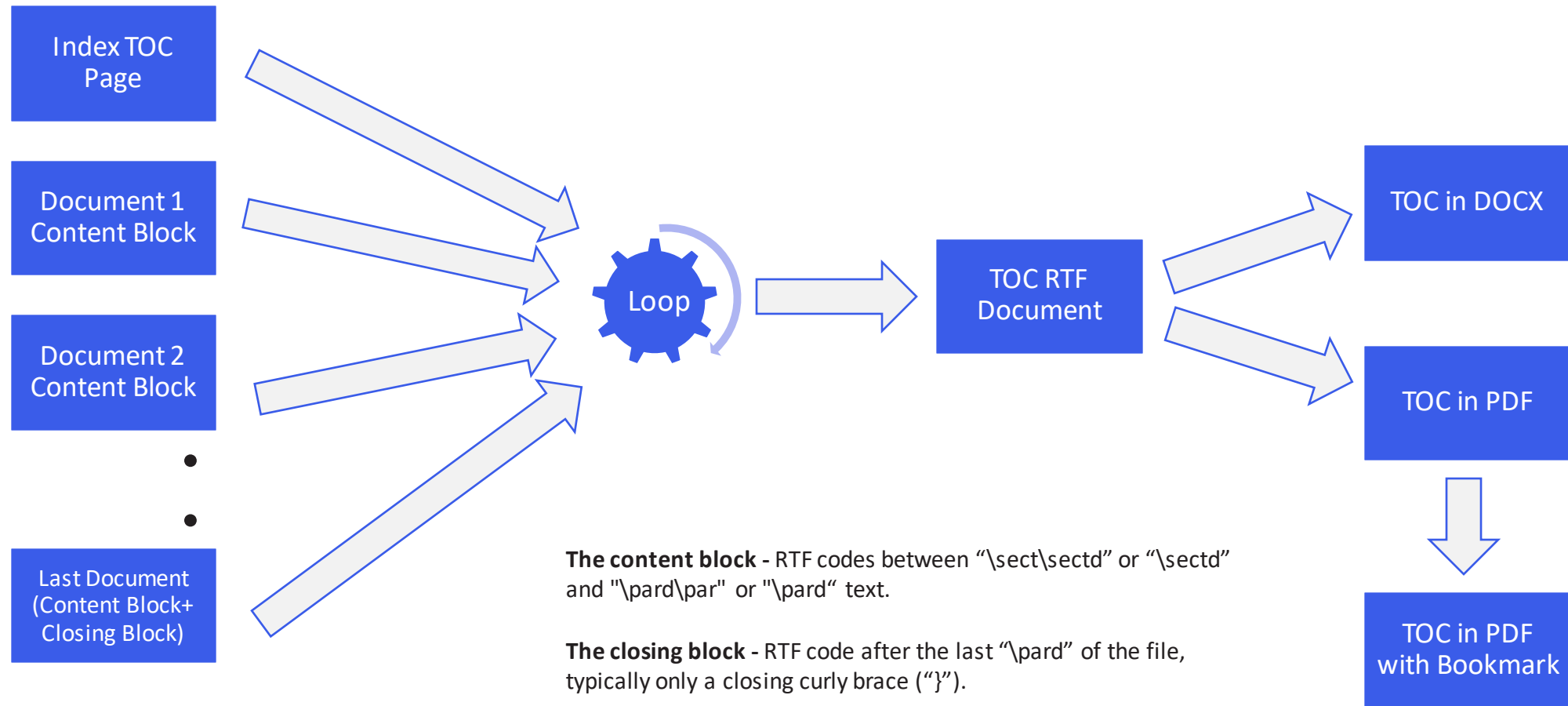
Sample code to create TOC Index page

#Concatenating hyperlinked tiles on the TOC index page

```
for x in range(1, (self.nooftocpage+1)):
    page_accumulate=page_accumulate+self.nooftocpage
    for file in self.filelist:
        ff = file.split('\\')[1]
        if self.file_cumpage[ff] == x:
            i = i + 1
            rtline =
            "\\trowd\\trkeep\\trqc\\n\\pard\\plain\\intbl\\sb0\\sa0\\qr\\f1\\
            \\fs16\\cf1\\ri72{\\%s\\cell}\\n\\pard\\plain\\intbl\\sb0\\sa0\\ql\\f
            1\\fs16\\cf1{\\field {\\*\\fldinst HYPERLINK \\I \"%s\" \\o
            \"%s\"} {\\fldrslt %s}}\\cell}\\n\\pard\\plain\\intbl\\sb0\\sa0
            \\qr\\f1\\fs16\\cf1{\\%s\\cell}\\n\\row}" %
            (i,f"{self.file_bookmark[ff].upper()}",f"{self.file_titles[ff].strip()}",
            self.file_btiles[ff].strip(), page_accumulate)
            page_accumulate += self.file_pages[ff]
            self.file_pages[ff] = page_accumulate
            temp.write(rtline)
    temp.write("\\n\\pard\\sect")
```



TOC process - Concatenate all RTFs



TOC process – DOCX/PDF creation

Creating DOCX/PDF format TOC file

#Converting RTF file into DOCX format using win32

```
def change_file_format(self, file_path, extension, constant):  
    word = Dispatch('Word.Application')  
    word.Visible = 1  
    file_path = os.path.abspath(file_path)  
    doc = word.Documents.Open(file_path)  
    doc.Activate()  
    # Rename path with .docx  
    new_file_abs = re.sub(r'\.\\w+$', extension, file_path)  
    # Save and Close  
    word.ActiveDocument.SaveAs(  
        new_file_abs, FileFormat = constant)  
    doc.Close(False)
```

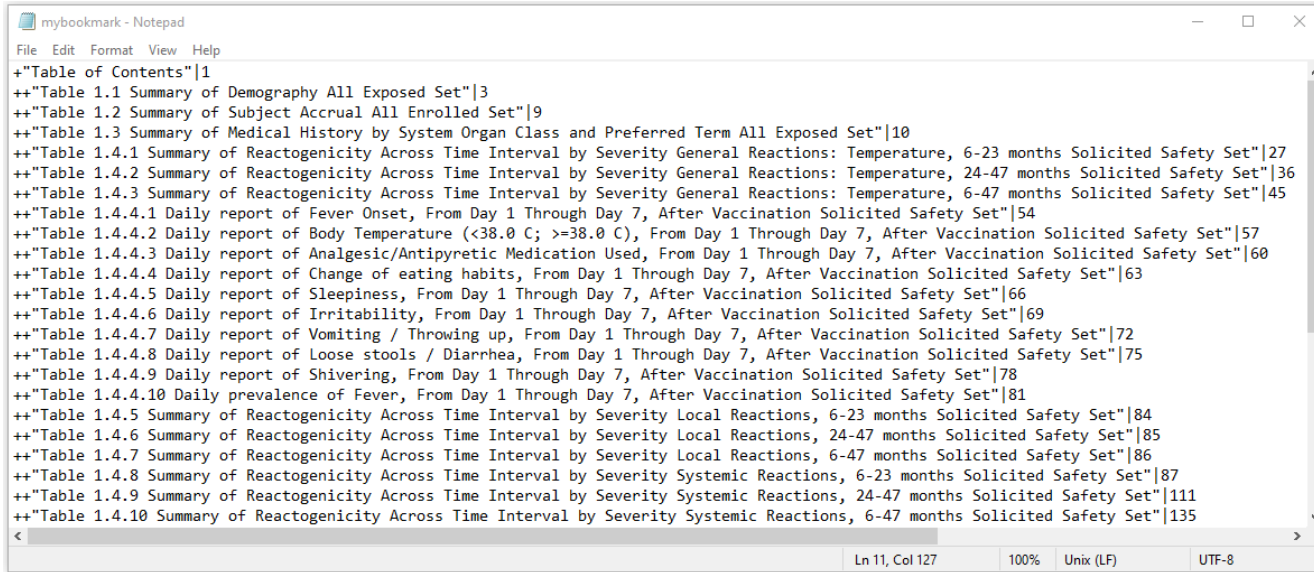
Extension/constant value for conversion

Constant 16 – Convert RTF in to DOCX format
.docx as Extension

Constant 17 – Convert RTF in to PDF format
.pdf as Extension

TOC process – PDF bookmark creation

Text file format for PDF bookmark



```
++"Table of Contents"|1
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```

PDF bookmark using pdfbookmarker package

```
#Generate bookmark using pdfbookmarker
if self.pdf_bookmark==1:
    self.genPdfBookmark()
    run_script(self.pathout+re.sub(r'\.rtf$',
'.pdf',self.fileout),self.pathout+"mybookmark.txt")
```

Final TOC output in PDF(with bookmark)

Bookmarks

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PDF Bookmark

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Index TOC Page

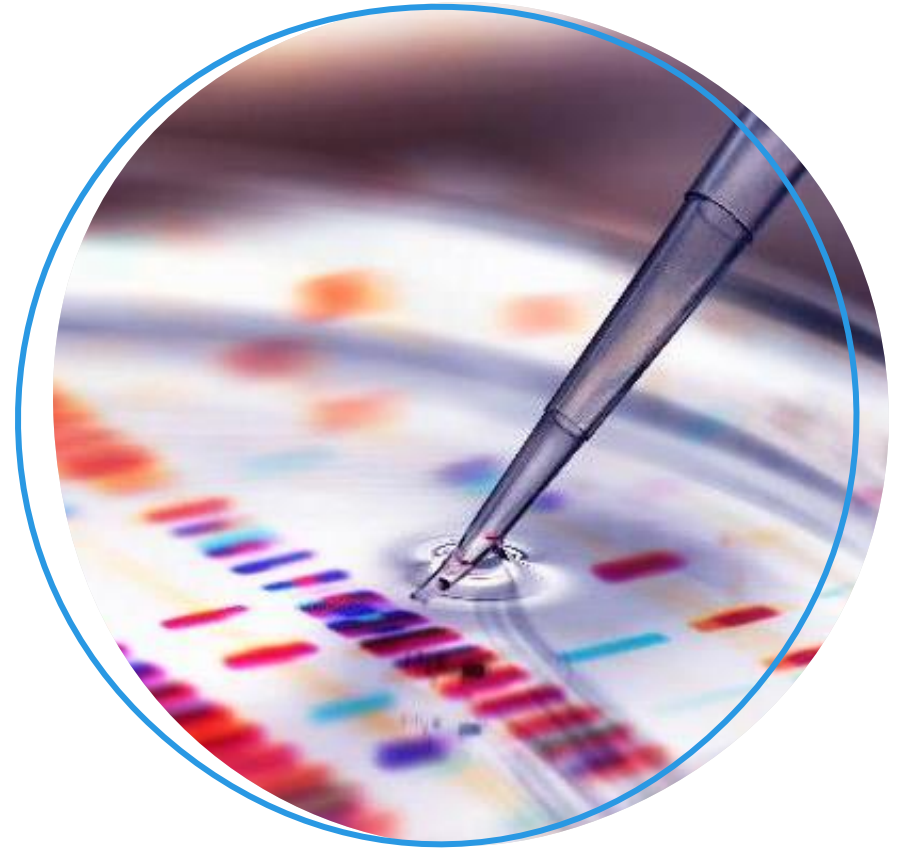
Key PYTHON packages

- Tkinter – Graphical user interfaces (GUIs)
- Ttkwidgets – Supports a variety of widgets as compared to Tkinter
- Codecs – Encoders and decoders for converting text between different representations
- RE – A regular expression specifies a set of strings that matches it
- win32com.client package – Convert RTF file into DOCX/PDF formats
- Pdfbookmarker – Create the PDF bookmarks
- Pyinstaller – Create PYTHON code to executable file



Limitations

- Generated through SAS ODS RTF statement
- SAS generated RTF outputs should hold the title information in a general format (starting with “Listing/Table/Figure/Appendix” followed by their number and title details
- The outputs are ordered based on the TLF/Appendix file names, so the user doesn’t have the provision to re-order the TLF position. The future version of the tool might have the facility to re-order the TLFs based on the user’s needs



Thank you

