Extracting Tables from PDFs

Using Camelot and Excalibur to automate PDF table extraction and export

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Overview

- PDF: brief history, structure, representing tables
- Camelot & Excalibur: overview, main features, installation
- Demo: quick tour of Camelot, visual debugging, and plotting
- Future improvements, Q&A

Portable Document Format

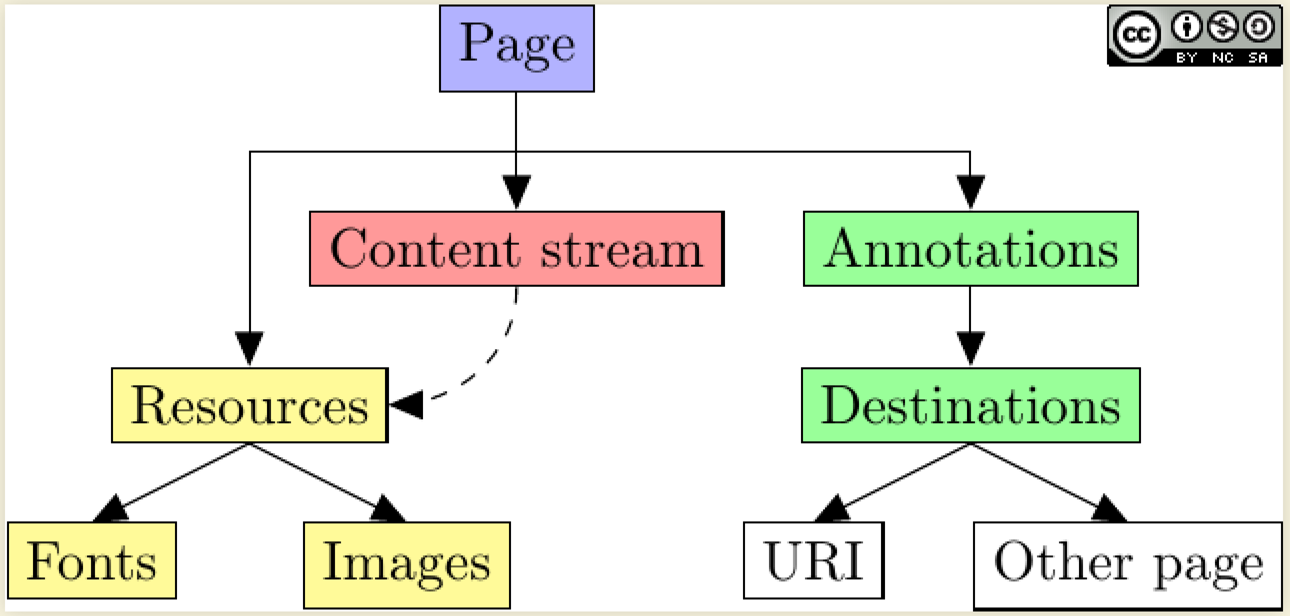
almost 30 years ago…

> *This document describes the base technology and ideas behind the project named "Camelot".*
> *[…] a universal way to communicate documents across a wide variety of machine configurations, operating systems and communication networks.*
> *[…] viewable on any display […] printable on any modern printers.*
>
> *—The Camelot Project, John Warnock*

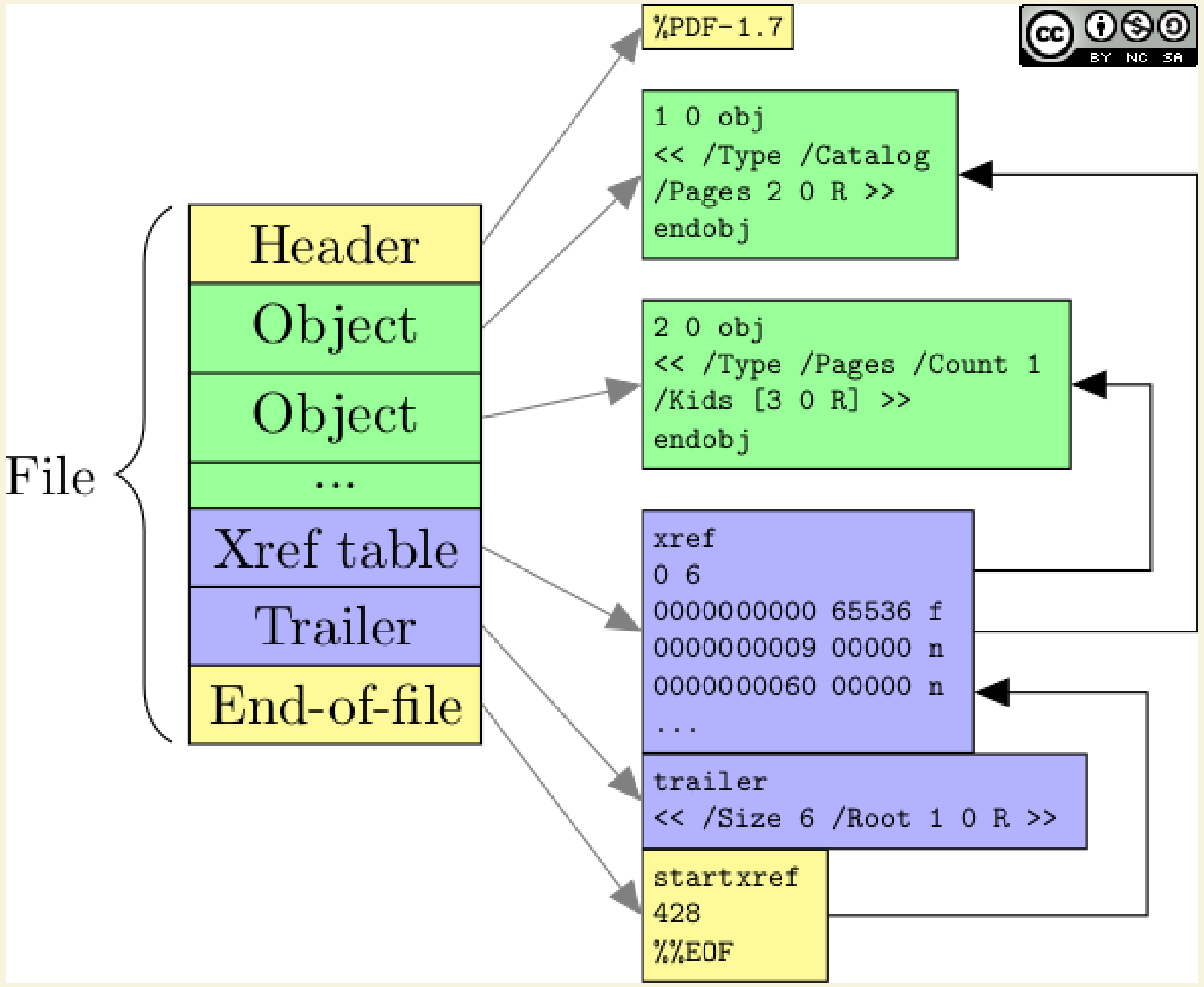
source: Evolution of the Digital Document: Celebrating Adobe Acrobat’s 25th Anniversary

PDF: At a Glance

- Created in the early 1990s by Adobe Systems
- Predates the World Wide Web and HTML
- Proprietary format initially, released as open standard as of v1.7
- Based on a subset of Adobe PostScript
- Self-contained: embedded fonts, attachments, annotations, rich media, etc.
- 13 versions released; an ISO standard since 2008 (PDF 1.7).
- Structured as a hierarchy of objects (words, paragraphs, fonts, etc.)



PDF: Structure



```
%PDF-1.7

1 0 obj
<< /Type /Catalog
/Pages 2 0 R >>
endobj

2 0 obj
<< /Type /Pages /Count 1
/Kids [3 0 R] >>
endobj

xref
0 6
0000000000 65536 f
0000000009 00000 n
0000000060 00000 n
...
trailer
<< /Size 6 /Root 1 0 R >>
startxref
428
%%EOF
```

source: Introduction to PDF syntax: by Guillaume Endignoux

Text Selection & PDF "Tables"

Looks familiar?

Often you need to: select *one cell at a time*, copy & paste, repeat.

PDF Table Extraction Tools

- Tabula - Java-based, open-source.
- pdfplumber - Python, open-source.
- pdftables - Python, proprietary, paid.
- pdf-table-extract - Python, open-source, no longer maintained.
- OCR.space - Proprietary, free and paid online service.

Camelot & Excalibur

Camelot

https://github.com/camelot-dev/camelot

Excalibur

https://github.com/camelot-dev/excalibur
https://tryexcalibur.com

Started in 2016 by **Vinayak Mehta** `@vortex_ape`

at `SocialCops` in Bangalore, India.

Camelot: Features

- **Excellent** documentation
- Python-based, MIT licensed
- Two extraction algorithms: *Lattice* and *Stream*
- Works well out-of-the-box, but **very configurable**
- Exports to CSV, TSV, Excel, JSON, HTML, or **Pandas DataFrames**!
- Visual debugging and plotting with `matplotlib`
- Actively maintained, **contributors welcome!**

Camelot & Excalibur: Installation

Camelot

Using Conda (*easiest way*)

```
conda install -c conda-forge camelot-py
```

Using `pip`, *after installing prerequisites*: `tk` and `ghostscript`

```
pip install --upgrade pip camelot-py[cv]
```

Excalibur

Using `pip`, *after installing prerequisites* `tk` and `ghostscript`

```
pip install --upgrade pip excalibur-py
```

Demo Time!

Future Improvements / Q&A

- Performance improvements
- Replacing `Ghostscript` with alternatives
- More tests
- Better memory footprint with large PDFs
- `<your-favourite-feature?>`

Questions ?

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