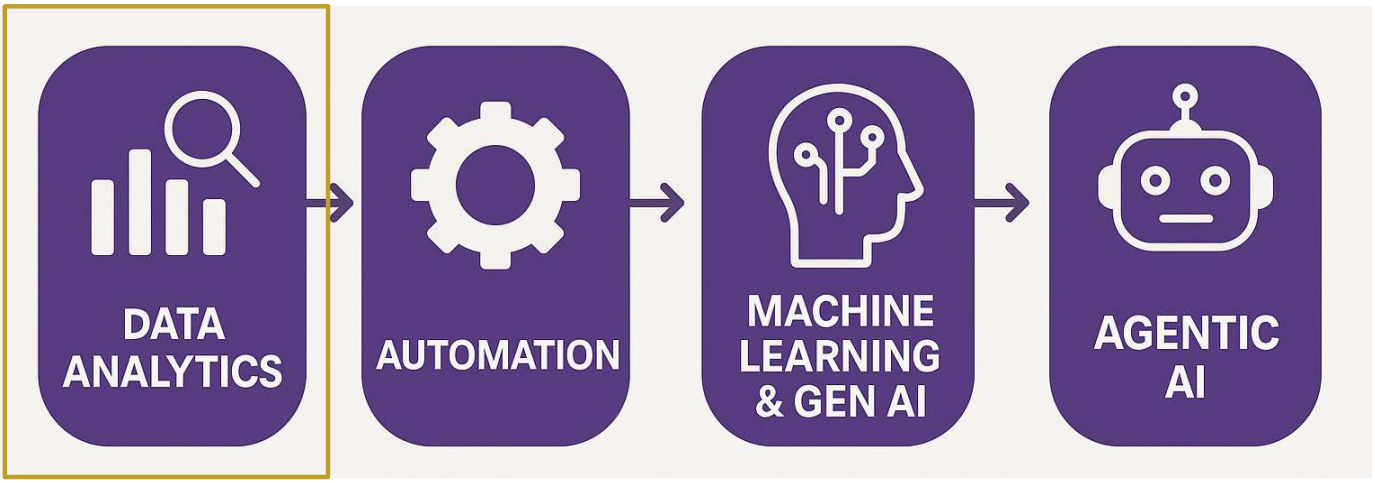

Data Analytics Workflows in Accounting & Finance
Acctg & Fin | BUS AN 500 | Class 02
Spring Qtr | 2026
FOSTER
SCHOOL OF BUSINESS
UNIVERSITY of WASHINGTON

What will we do today?

- **Review**
- Data Analytics Workflows
  - Overview & Demo
  - Warm-up task and RegEx
  - Mapping a process to a workflow
  - Demo 2
  - Propose a workflow
  - Submission

Course Diagram



- Transaction analysis
- How firms disclose performance

Feedback on Class 01 Submissions

Overall – great job.

Structured task (using the dashboard) – excellent!

Unstructured task (non-GAAP) – great job!

- PAR, EBITDA, adjusted Net Income / EPS
- Adjustments typically need to be items that are in the GL

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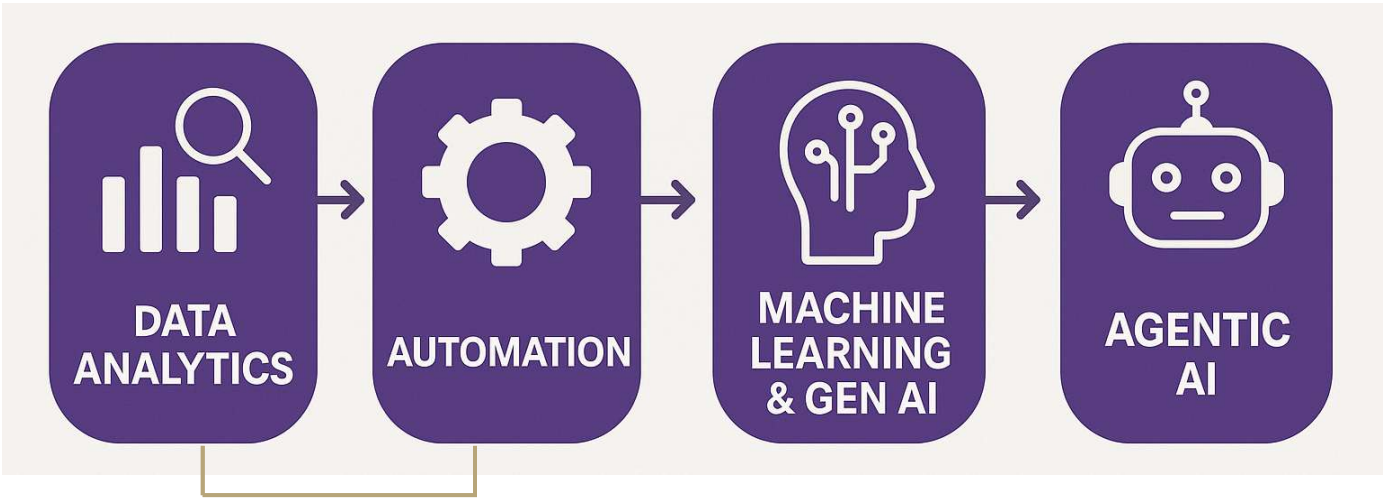
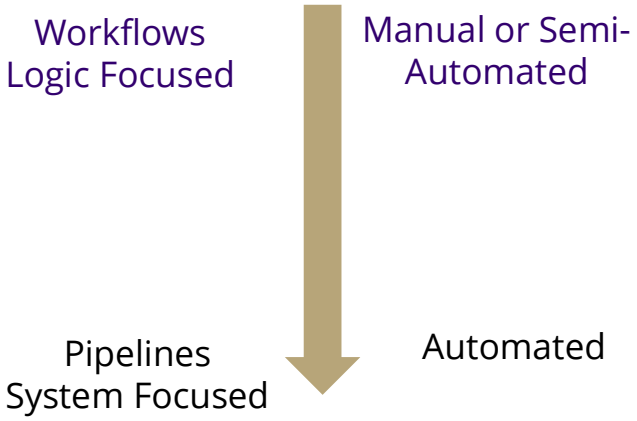


Analytics workflows & pipelines

Analytics Workflows & Pipelines

- *Analytics workflow* refers to the logical sequence of analytical steps required to transform inputs into outputs.

- *Analytics pipeline* refers to the operationalized, often automated system that executes those steps, typically with an emphasis on scalability, repeatability, and data movement.



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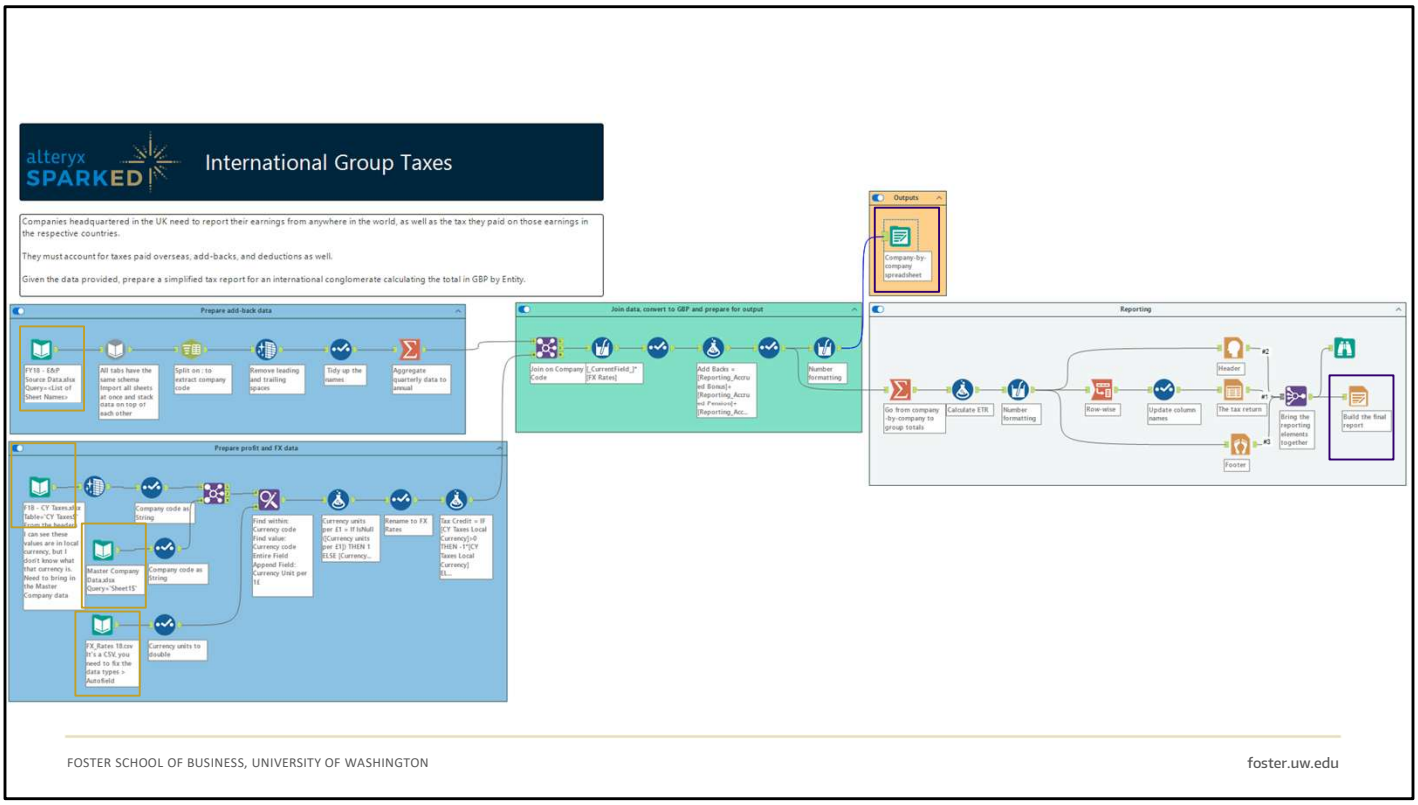
Analytics Workflows

As a demo of building a workflow we will examine an *international group taxes workflow*.

Setting: Large multinational company with foreign reporting entities.

Objective: Create an effective tax rate report and provide clean data for further analysis.

Problem: Company data is coming from multiple systems and not in a common currency (instead in local currencies).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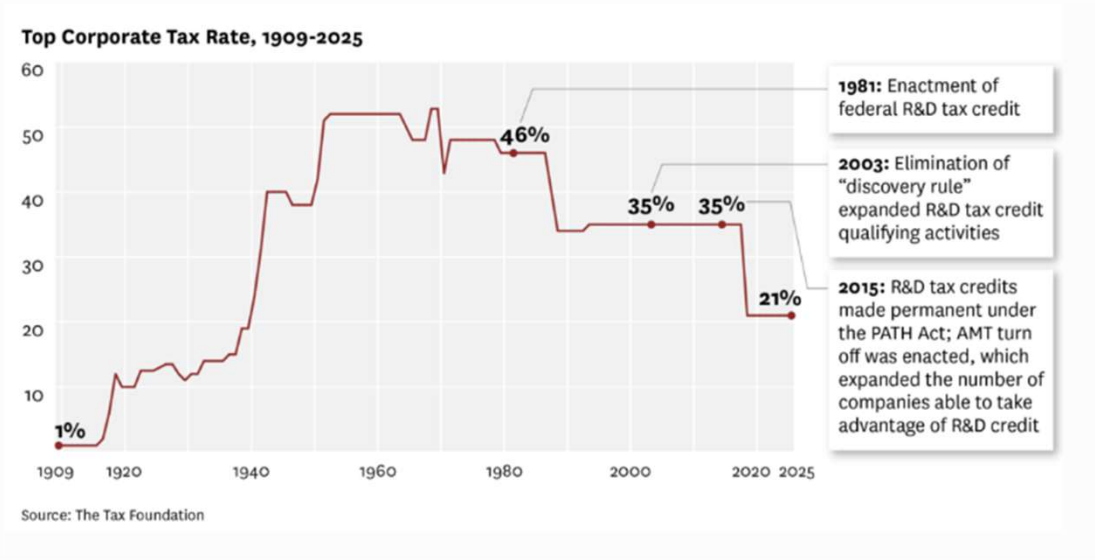
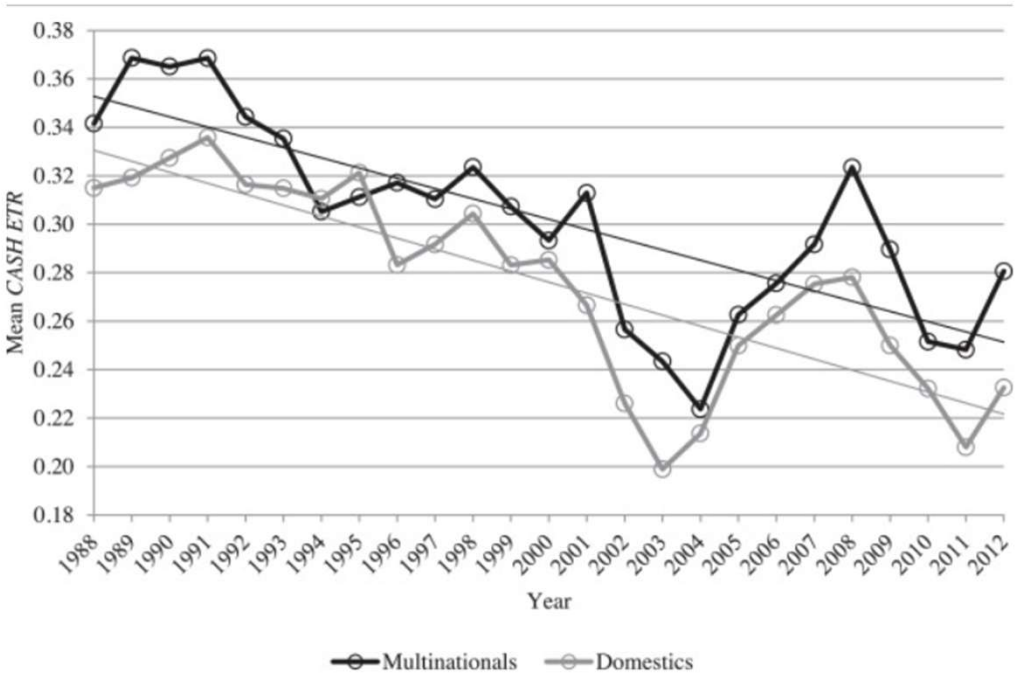
International Group Taxes
Companies headquartered in the UK need to report their earnings from anywhere in the world, as well as the tax they paid on those earnings in the respective countries.
They must account for taxes paid overseas, add-backs, and deductions as well.
Given the data provided, prepare a simplified tax report for an international conglomerate calculating the total in GBP by Entity.
Outputs
Company-by-company spreadsheet
Prepare add-back data
Join data, convert to GBP and prepare for output
Reporting
Prepare profit and FX data

Background on Accounting For Taxes

- Accounting measures of tax expense typically do not equal the taxes paid in cash by a firm, the “Book-Tax Differences.”
- Companies keep separate sets of financial records for financial reporting and for tax.
- How much of their profit (net income) does a company pay in tax?


Top Corporate Tax Rate, 1909-2025
60
50
40
30
20
10
1%
46%
35%
35%
21%
1909
1920
1940
1960
1980
2000
2020
2025
1981: Enactment of federal R&D tax credit
2003: Elimination of "discovery rule" expanded R&D tax credit qualifying activities
2015: R&D tax credits made permanent under the PATH Act; AMT turn off was enacted, which expanded the number of companies able to take advantage of R&D credit
Source: The Tax Foundation

Source: Scott D. Dyreng, Michelle Hanlon, Edward L. Maydew, Jacob R. Thornock, Changes in corporate effective tax rates over the past 25 years, Journal of Financial Economics, 2017.



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Book–Tax Differences

Book-Tax Differences = Permanent + Temporary Differences

e.g.,
Fines and Penalties
Non-Taxable Income

e.g.,
Depreciation differences
Deferred compensation

Depreciation

Accounting uses Depreciation to allocate the cost of an asset over its useful life.

E.g., A building might be expected to last 40 years in service, but a computer may only last 5.

A common way to allocate the cost is to divide the cost over the useful life of the asset.

Straight-line depreciation examples

For example:

July 1st 2025: Company purchases a computer for $1800. The useful life is estimated at 5 years / 60 months:

- Depreciation = $1800/60 = $30 / month.

Depreciation schedule

Fiscal Year Ending	Depreciation Expense	Running Balance*	Why?
2025	$180	$180	Asset in use for six months
2026	$360	$540	Annual amount
2027	$360	$900	Annual amount
2028	$360	$1,260	Annual amount
2029	$360	$1,620	Annual amount
2030	$180	$1,800	Fully depreciated

* The running balance is a contra-asset called Accumulated Depreciation, a negative number to offset the asset's original balance, typically reported on a net basis on the balance sheet.

IRS Tax schedules

IRS uses an accelerated method for tax deductions called:

MACRS = Modified Accelerated Cost Recovery System

IRS publication 946: Appendix A.

Table A-1. **3-, 5-, 7-, 10-, 15-, and 20-Year Property Half-Year Convention**

Year	Depreciation rate for recovery period					
	3-year	5-year	7-year	10-year	15-year	20-year
1	33.33%	20.00%	14.29%	10.00%	5.00%	3.750%
2	44.45	32.00	24.49	18.00	9.50	7.219
3	14.81	19.20	17.49	14.40	8.55	6.677
4	7.41	11.52	12.49	11.52	7.70	6.177
5		11.52	8.93	9.22	6.93	5.713
6		5.76	8.92	7.37	6.23	5.285
7			8.93	6.55	5.90	4.888
8			4.46	6.55	5.90	4.522
9				6.56	5.91	4.462
10				6.55	5.90	4.461
11				3.28	5.91	4.462
12					5.90	4.461
13					5.91	4.462
14					5.90	4.461
15					5.91	4.462
16					2.95	4.461
17						4.462
18						4.461
19						4.462
20						4.461
21						2.231

Tax Depreciation schedule (MACRS)

Fiscal Year Ending	Depreciation Expense	Running Balance	Why?
2025	$360	$360	DDB*, Half-year convention
2026	$576	$936	Accelerated amount
2027	$345.60	$1281.60	Accelerated amount
2028	$207.36	$1,488.96	Accelerated amount
2029	$207.36	$1,696.32	Accelerated amount
2030	$103.68	$1,800	Fully depreciated

** Double the declining balance, 2*(1/lifetime in yrs), for 5 yrs 2*1/5 = 40% * 1800 = 720.

Tax-based useful lives, other examples

Short (around 5 years)	Medium (7-10 years)	Long (15+ years)
Equipment (5 yrs)	Machinery (7 yrs)	Land Improvements (15 years)
Cars (5 years)	Office Furniture (7 yrs)	Commercial Real Estate (39 years)
Computers (5 yrs)	Manufacturing Equipment (up to 10)	Residential Rental Property (27.5 years)

Bonus Depreciation

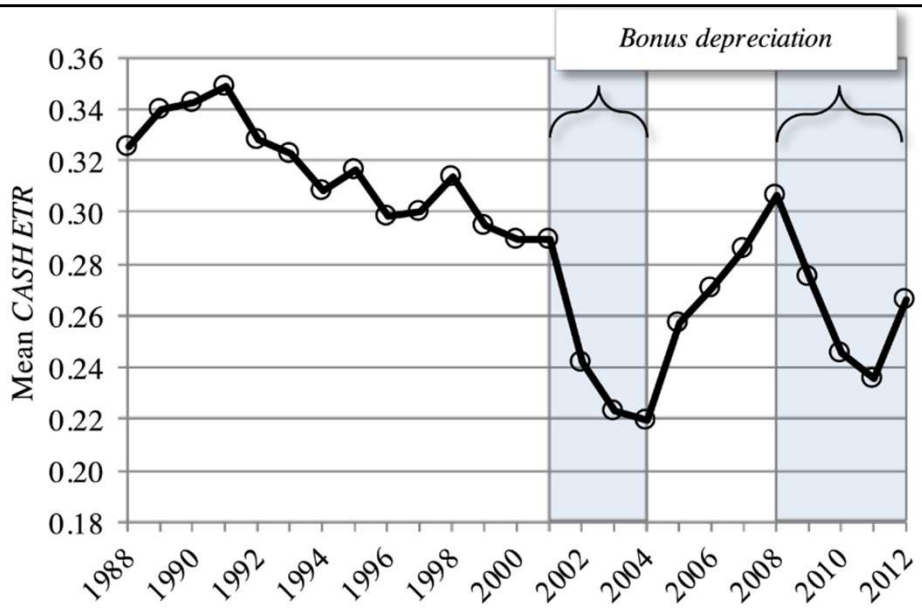
Bonus Depreciation Tax Regulations in the US grant a temporary tax shield to depreciable assets.

Historical examples:

2001–2004 (post 9/11 stimulus): up to 50% bonus depreciation

2008-2010 (financial crisis stimulus): 50%

2018-2022 (TCJA): 100% bonus deprecation



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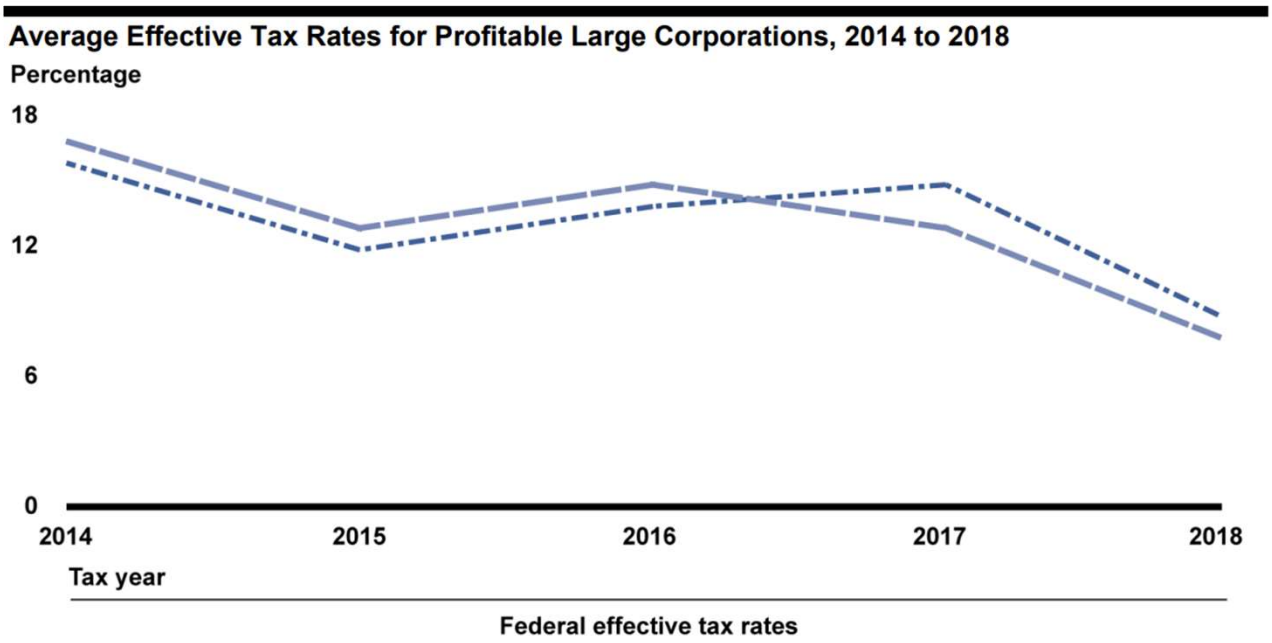
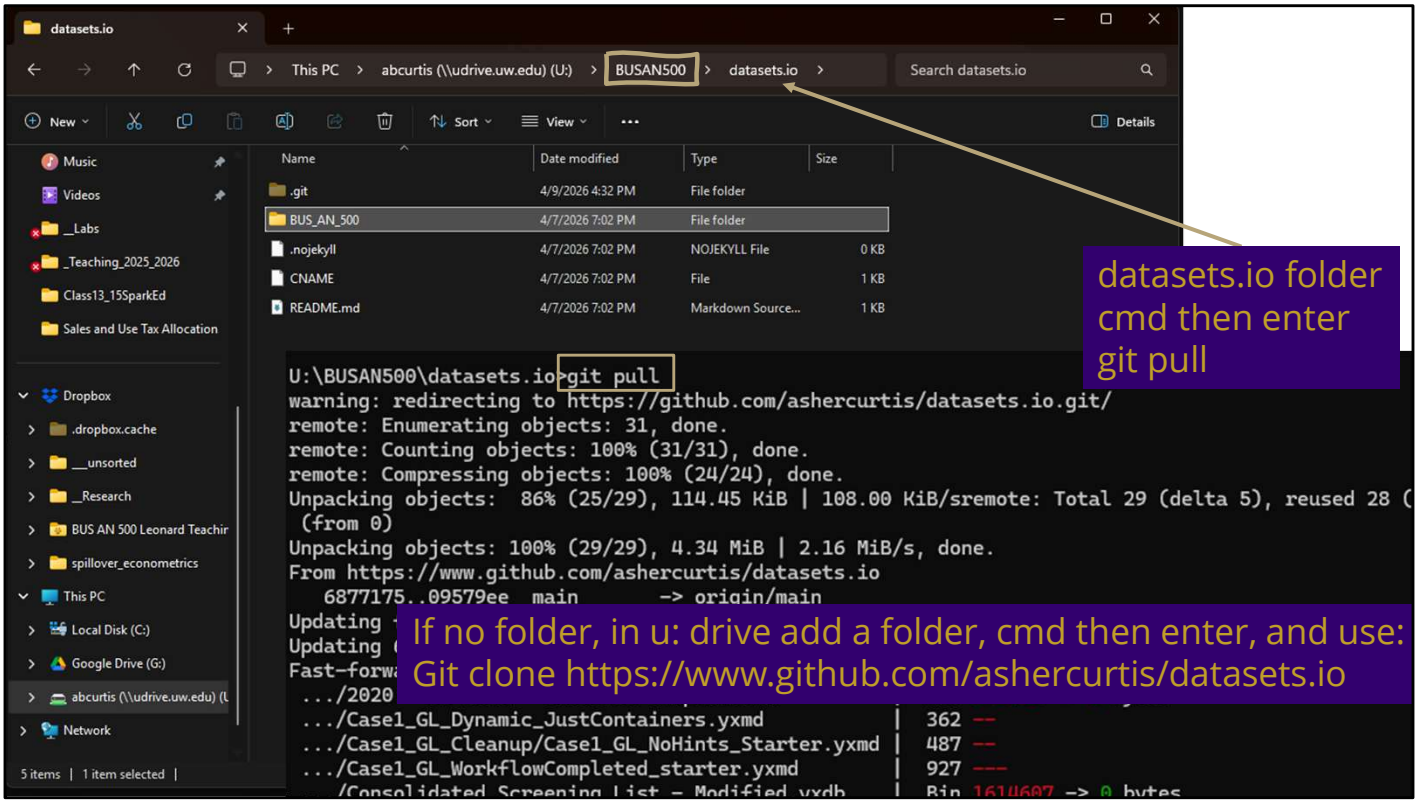


https://www.gao.gov/assets/gao-23-105384.pdf


datasets.io
This PC
abcurtis (\\udrive.uw.edu) (U:)
BUSAN500
datasets.io
Search datasets.io
New
Sort
View
Details
Music
Videos
_Labs
_Teaching_2025_2026
Class13_15SparkEd
Sales and Use Tax Allocation
Dropbox
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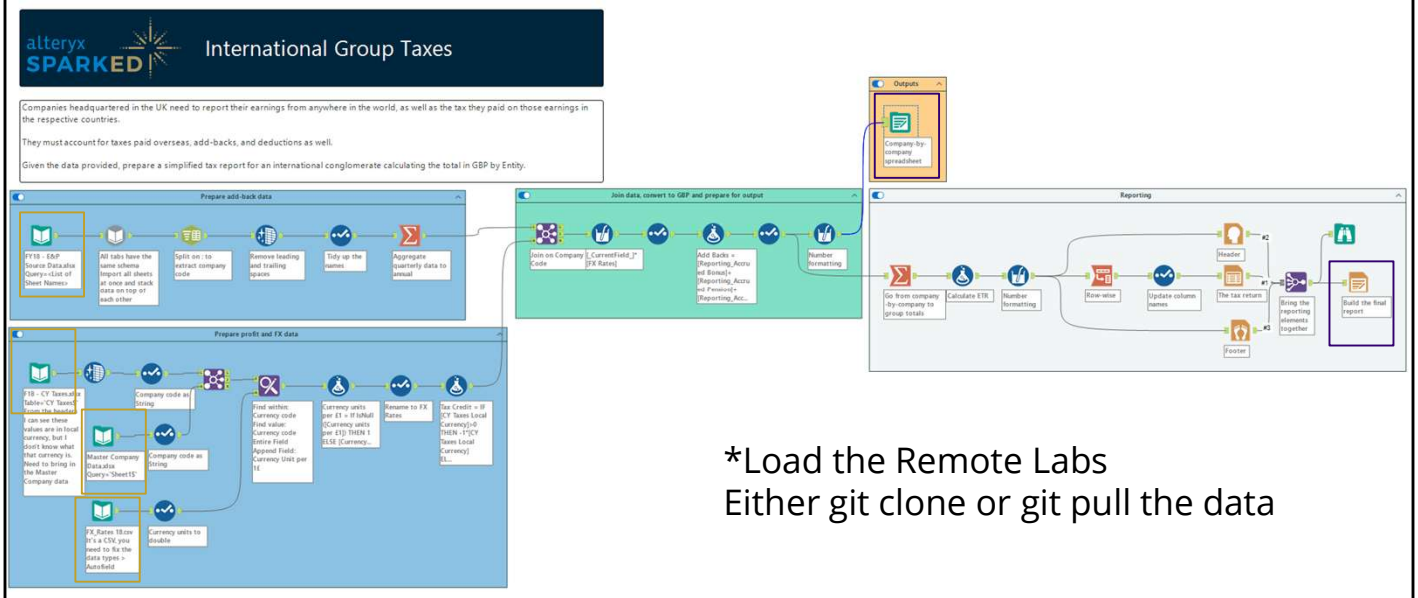
This PC
Local Disk (C:)
Google Drive (G:)
abcurtis (\\udrive.uw.edu) (U
Network
5 items | 1 item selected
Name
Date modified
Type
Size
.git
4/9/2026 4:32 PM
File folder
BUS_AN_500
4/7/2026 7:02 PM
File folder
.nojekyll
4/7/2026 7:02 PM
NOJEKYLL File
0 KB
CNAME
4/7/2026 7:02 PM
File
1 KB
README.md
4/7/2026 7:02 PM
Markdown Source...
1 KB
datasets.io folder
cmd then enter
git pull
U:\BUSAN500\datasets.io>git pull
warning: redirecting to https://github.com/ashercurtis/datasets.io.git/
remote: Enumerating objects: 31, done.
remote: Counting objects: 100% (31/31), done.
remote: Compressing objects: 100% (24/24), done.
Unpacking objects: 86% (25/29), 114.45 KiB | 108.00 KiB/sremote: Total 29 (delta 5), reused 28 (
(from 0)
Unpacking objects: 100% (29/29), 4.34 MiB | 2.16 MiB/s, done.
From https://www.github.com/ashercurtis/datasets.io
6877175..09579ee main -> origin/main
If no folder, in u: drive add a folder, cmd then enter, and use:
Git clone https://www.github.com/ashercurtis/datasets.io

Start
4

End
2



*Load the Remote Labs
Either git clone or git pull the data

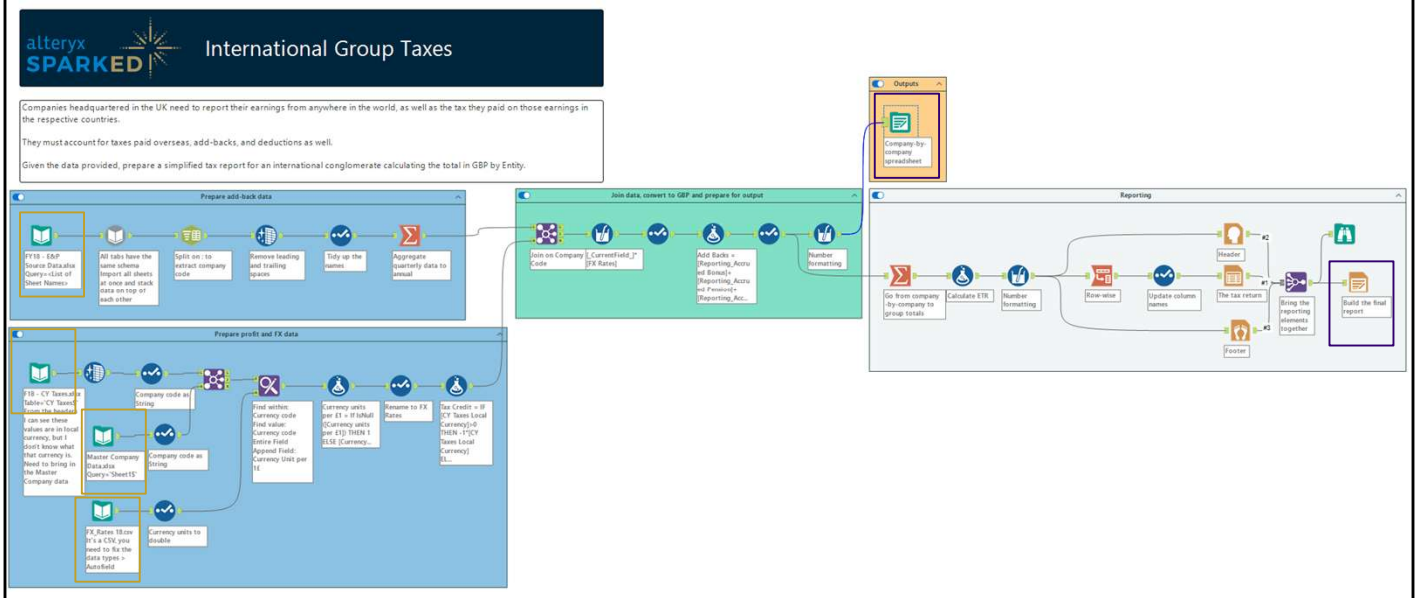
Demo

- Bring in the quarterly E&P data, clean it, and aggregate it into yearly totals for each company.
- Bring in the other datasets and blend them into one stream so that each company code has the associated filing entity, tax values, and FX rates.
- Combine the two streams and apply the FX rate to income, tax and add-backs. Calculate the taxable income and taxes required given a 19% tax rate.
- Prepare a spreadsheet with company totals.
- Calculate the effective tax rate and prepare a formatted tax return PDF for the entire organization showing pre-tax income, add backs, taxable income, tax, and effective tax rate.

Acronyms: E&P is earnings and profit, FX is foreign exchange, in this case add backs are in the CY Taxes Data and include many different categories such as:

Start
4

End
2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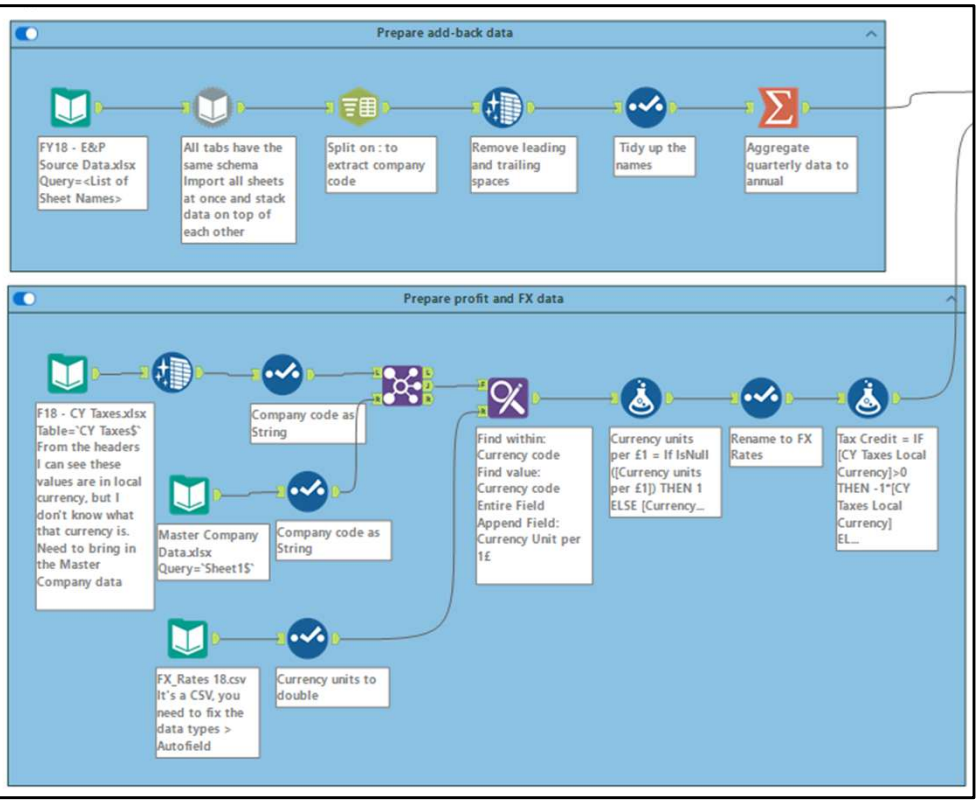
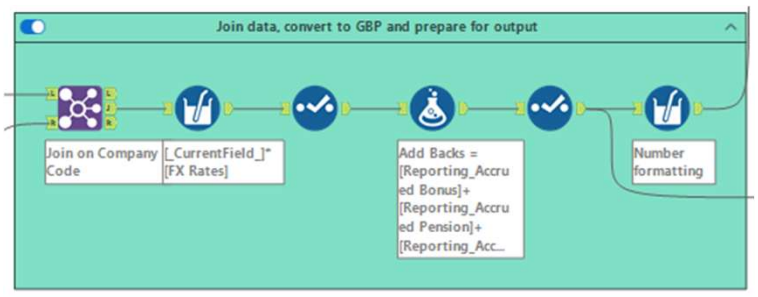
Step 1
import and prepare data

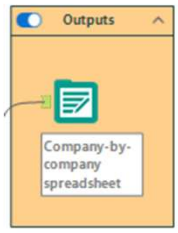
- Import
- Clean-up
- Joins
- Calculations



Consolidate to a single data source for the company

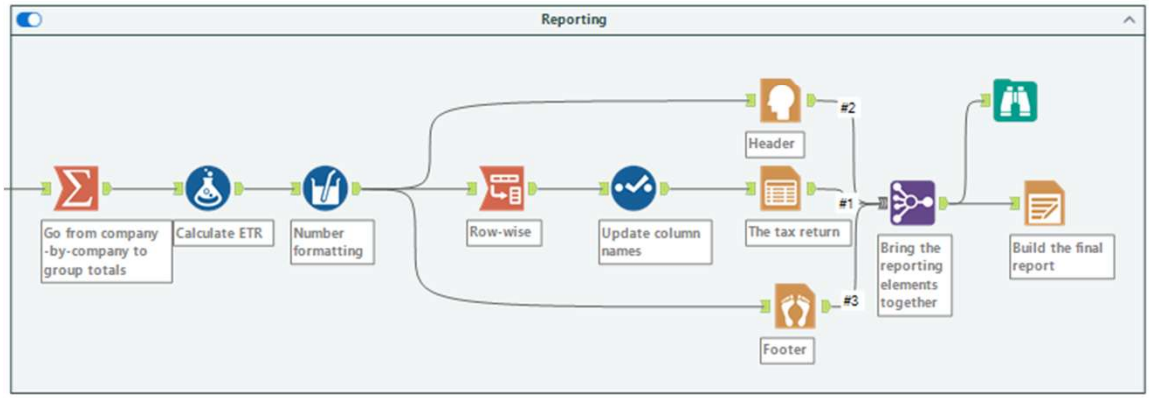
- Convert all amounts to common currency
- Aggregate to desired account level (add backs, taxable income, tax)





Output desired data and report

- Report requires some additional formatting steps and calculations



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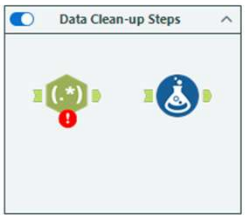
employee_code_cleanup.yxmd

We have been asked to get a head count of accounting & finance employees in each country, by salaried (paid monthly = "M") and wage employees (paid weekly "W"). But the data is messy because someone entered country names instead of codes sometimes.

Employee codes are meant to be:
3-digit Country Code | Employee ID - office ID | pay frequency

So that:
AUS1234-10M

Is interpreted as:
Employee based in Australia Employee Number 1234, office location #10, paid monthly (salaried)



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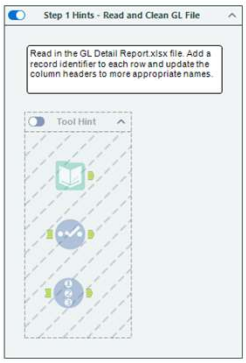
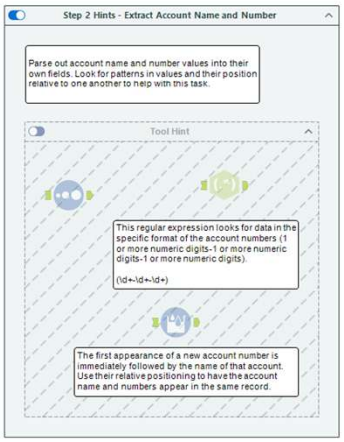
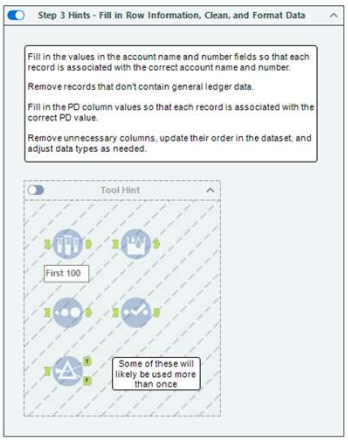
General Ledger Clean Up

The Accounting Department needs to verify the last GL report issued to management against data in the Corporate ERP system. The only version of the report available is a formatted Excel spreadsheet which is not in a format that can be used by any of the accounting systems. This workflow needs to ingest the spreadsheet and build a clean tabular data set that can be consumed by the accounting systems.

All of the report header information can be ignored but there are challenges with the field names and table structure that will need to be resolved. This includes stripping out subtotals and filling down fields so that all records have all relevant data. Also, the Account field contains both the GL account number and name. These will need to be split to separate fields.







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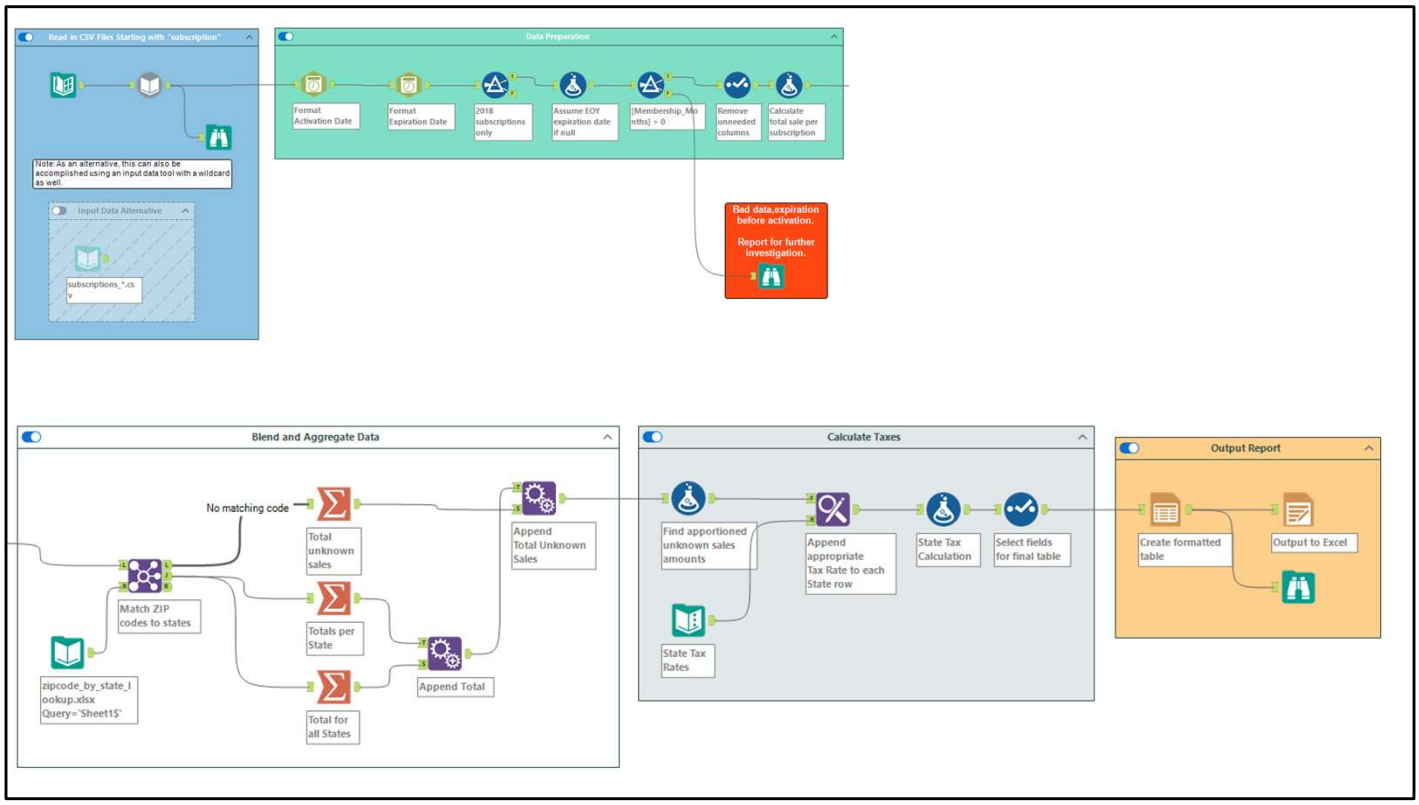
Read in CSV Files Starting with "subscription"
Note: As an alternative, this can also be accomplished using an input data tool with a wildcard as well.
Input Data Alternative
subscriptions_*.csv
Data Preparation
Format Activation Date
Format Expiration Date
2018 subscriptions only
Assume EOY expiration date if null
[Membership_Months] > 0
Remove unneeded columns
Calculate total sale per subscription
Bad data,expiration before activation.
Report for further investigation.
Blend and Aggregate Data
No matching code
Total unknown sales
Append Total Unknown Sales
Match ZIP codes to states
Totals per State
Append Total
zipcode_by_state_lookup.xlsx Query='Sheet1$'
Total for all States
Calculate Taxes
Find apportioned unknown sales amounts
Append appropriate Tax Rate to each State row
State Tax Calculation
Select fields for final table
State Tax Rates
Output Report
Create formatted table
Output to Excel

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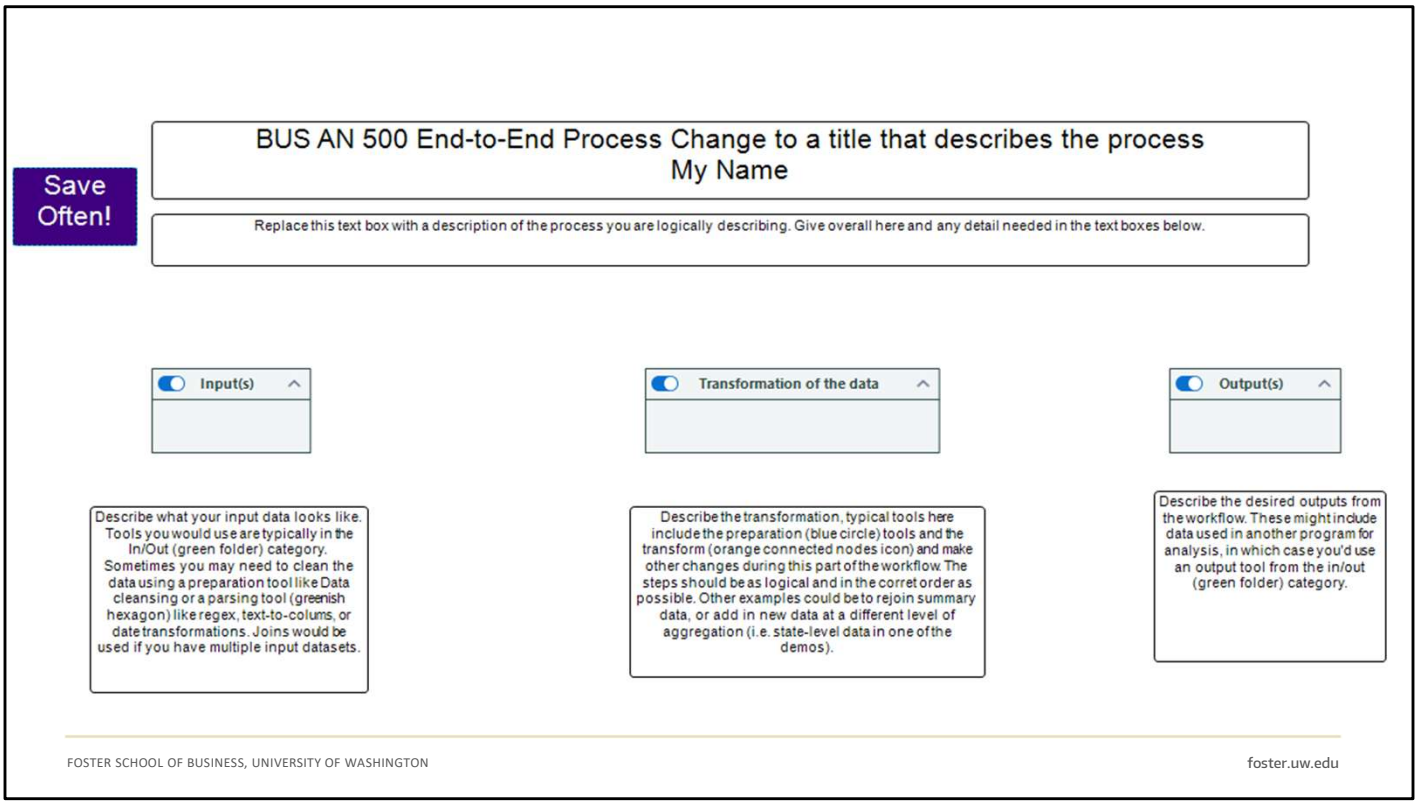
Save Often!
BUS AN 500 End-to-End Process Change to a title that describes the process
My Name
Replace this text box with a description of the process you are logically describing. Give overall here and any detail needed in the text boxes below.
Input(s)
Transformation of the data
Output(s)
Describe what your input data looks like. Tools you would use are typically in the In/Out (green folder) category. Sometimes you may need to clean the data using a preparation tool like Data cleansing or a parsing tool (greenish hexagon) like regex, text-to-colums, or date transformations. Joins would be used if you have multiple input datasets.
Describe the transformation, typical tools here include the preparation (blue circle) tools and the transform (orange connected nodes icon) and make other changes during this part of the workflow. The steps should be as logical and in the corret order as possible. Other examples could be to rejoin summary data, or add in new data at a different level of aggregation (i.e. state-level data in one of the demos).
Describe the desired outputs from the workflow. These might include data used in another program for analysis, in which case you'd use an output tool from the in/out (green folder) category.
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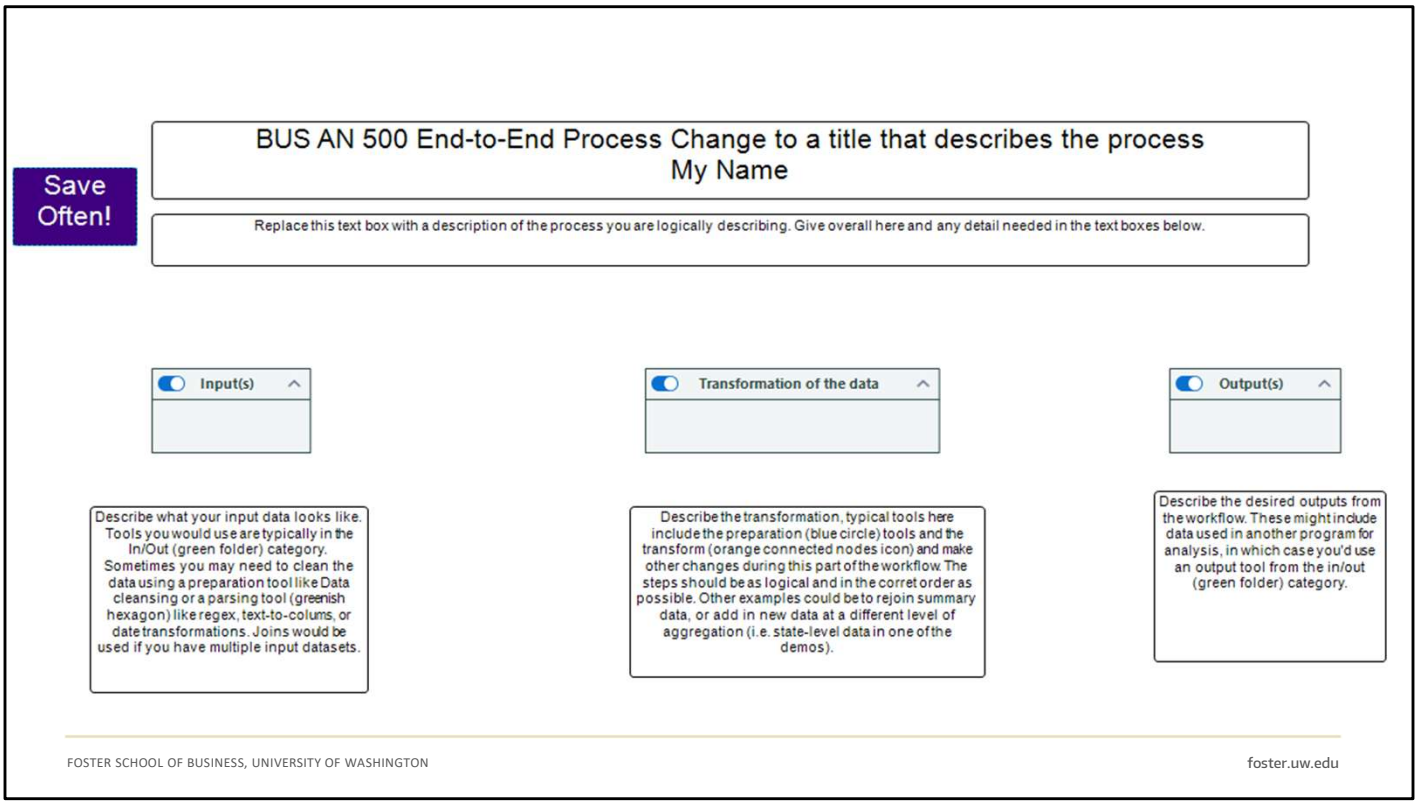
Submission

Upload all the files to canvas “Professionalism (individual): Alteryx Submission” submission portal.

All individually or as a single zip (either is fine).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What will we do next?

Automation

- Explore the potential for Automation in Accounting & Finance Analytics and more broadly.

Thank you

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