



Last Day Cheat Sheet

Power BI • Python • KNIME | Module 2 Quick Reference

⚡ UNIT 1: POWER BI

Core Components

Component	What It Does	Key Use
Power BI Desktop	Create reports & visuals	Build & design reports
Power BI Service	Cloud SaaS platform	Publish, share, schedule refresh (up to 8/day)
Power BI Mobile	View dashboards on the go	Consume reports on mobile
Power Query Editor	Data cleaning & transformation	Launched via 'Transform Data' button

Key Building Blocks

Element	Definition
Dataset	Collection of data used to create visuals
Report	Multi-page canvas with visuals (Reading vs Editing view)
Dashboard	Single canvas of tiles & widgets (pinned from reports)
Tile	Rectangular box holding one visual on a dashboard
Workspace	Container for dashboards, reports, datasets & dataflows
App	Collection of related dashboards & reports for distribution
Dataflow	Reusable cloud-based data preparation entity

Desktop Views

View	Purpose
Report View	Add & arrange visualizations
Data View	See data in tabular format
Model View	Manage table relationships

Key Features to Remember

Feature	What It Does
Q&A	Ask questions in natural language
DAX	Create calculated columns, measures & dynamic titles
Drillthrough	Explore detailed data behind a visual
Cross-Filtering	Visuals filter each other on a page
Bookmarks	Capture & save report states for storytelling
Slicer Sync	Synchronize filters across multiple pages
Conditional Formatting	Highlight data based on rules
Quick Insights	Auto-generate insights from datasets

Feature	What It Does
AI Insights	Identify trends & anomalies in KPIs
Anomaly Detection	Find unusual patterns in data
Key Influencers	Identify factors driving a metric
Decomposition Tree	Break down data by multiple dimensions
Paginated Reports	Pixel-perfect printable reports
Row-Level Security (RLS)	Security: control data access by row
Power Automate	Automate workflows via report triggers
Publish to Web	Share reports with external users

Best Visualization to Use

Use Case	Best Visual
Trend over time	Line Chart
Compare categories	Bar Chart
Proportions of a whole	Pie Chart
Relationships between variables	Scatter Plot
Single KPI value	Card
Value vs target	Gauge
Hierarchical data	Treemap
Geographic data	Map / ArcGIS Maps
Sales funnel stages	Funnel
Interactive filtering	Slicer

Capacity Types

Type	Description
Shared Capacity	Shared with other Microsoft customers (free tier)
Dedicated Capacity	Fully committed to a single customer (premium)

💡 *Scheduled refresh: up to 8 times/day in Power BI Service*

💡 *Pin a report PAGE → adds entire page as single tile on dashboard*

💡 *Pin a VISUAL → adds individual visual as tile on dashboard*

UNIT 2: PYTHON

Data Structures Comparison

Structure	Ordered?	Mutable?	Duplicates?	Key Feature
List []	✅ Yes	✅ Yes	✅ Yes	Most versatile — use for collections
Tuple ()	✅ Yes	❌ No	✅ Yes	Immutable — use for fixed data
Set { }	❌ No	✅ Yes	❌ No	Unique values only

Structure	Ordered?	Mutable?	Duplicates?	Key Feature
Dictionary { }	✗ No*	✓ Yes	Keys: No	Key-value pairs

💡 *Python 3.7+ dictionaries maintain insertion order

Essential Methods

Method	Works On	What It Does
append(x)	List	Add item to end
pop()	List	Remove & return last item
remove(x)	List	Remove first occurrence of x
extend([...])	List	Add multiple items to end
sort()	List	Sort in ascending order
reverse()	List	Reverse order
clear()	List	Remove all items
index(x)	List	Return index of first x
len(x)	Any	Return length
keys()	Dict	Return all keys
values()	Dict	Return all values
items()	Dict	Return all key-value pairs
split()	String	Split string into list
join()	String	Combine list into string
upper() / lower()	String	Change case

Control Flow

Statement	Purpose	Remember
if / elif / else	Make decisions based on conditions	elif = additional condition check
for loop	Iterate over a sequence	range(3) → 0, 1, 2 (not 1,2,3!)
while loop	Execute while condition is True	Can loop infinitely if not careful
break	Exit loop entirely	—
continue	Skip current iteration	—
pass	Placeholder for future code	Does nothing
return	Exit function & send value back	Terminates the function

💡 range(3) generates: 0, 1, 2 — starts at 0, excludes the end number!

Key Libraries

Library	Primary Use
NumPy	Numerical computations & arrays
Pandas	Data manipulation, analysis & cleaning
Matplotlib	Static data visualization (charts & plots)
Plotly	Interactive visualizations

Library	Primary Use
Scikit-learn	Machine learning & data preprocessing
Statsmodels	Statistical modeling & time series
TensorFlow	Deep learning
NLTK	Natural language processing

💡 *NumPy = crunch numbers | Matplotlib = draw charts | Pandas = wrangle data*

Functions & Special Concepts

Concept	Syntax / Description
Define function	def myFunc():
Lambda (anonymous)	lambda x: x * 2 — inline one-liner function
map()	Apply a function to all items in an iterable
try-except	Handle exceptions and errors
global	Declare variable as global inside a function
nonlocal	Declare variable as nonlocal in a nested function
Classes	Define custom data types using class keyword
zip()	Iterate over multiple sequences simultaneously

Quick Output Traps

Code	Output	Why
x = "Python"; len(x)	6	P-y-t-h-o-n = 6 characters
range(3)	0, 1, 2	Starts at 0, excludes 3
x = [1,2,3]; x[-1]	3	Negative index = from the end
x = [1,2,3,4]; x[1:3]	[2, 3]	Slice: includes index 1, excludes index 3
x = "Data"; x[1]	'a'	Index 0=D, 1=a, 2=t, 3=a
"Analytics"[0]	'A'	First character, index 0

UNIT 3: KNIME

What is KNIME?

- **Full name:** KNIME Analytics Platform
- Drag-and-drop interface — no coding required
- Workflow-based: connect nodes to build data pipelines
- Supports Big Data, ML, visualization, automation & deployment

Core Node Categories

Category	Key Nodes	Purpose
Data Input	File Reader, Database Connector	Load data from CSV, DB, etc.
Data Output	CSV Writer, Excel Writer, JSON Writer, XML Writer	Export processed data

Category	Key Nodes	Purpose
Data Transformation	Joiner, Concatenate, Row Filter, Column Filter, Row Splitter, Column Splitter, Pivot, GroupBy, Sorter, Normalizer, Missing Value, One-Hot Encoding, Column Rename, Numeric Binner, Math Formula, String Manipulation, Date&Time Manipulation	Clean & reshape data
Statistics & EDA	Statistics, Data Explorer, Correlation Analysis, Chi-Square Test, Group Comparison, PCA	Explore & analyze data
Machine Learning	Decision Tree, Random Forest, K-Means, Logistic Regression, Linear Regression, SVM, Neural Network, Naive Bayes, K-NN, Gradient Boosting, XGBoost, LightGBM, AdaBoost, CatBoost, DBSCAN, Hierarchical Clustering, Ensemble Learner	Build predictive models
Model Evaluation	Scorer, Cross-Validation Loop, Partitioning, Feature Selection, Parameter Optimization	Evaluate & tune models
Visualization	Scatter Plot, Bar Chart, Pie Chart, Box Plot, Histogram, Line Chart, Time Series Plot	Create charts
Dashboard	Dashboard Components, Interactive Table, Interactive Range Slider Filter, Interactive Plots	Build interactive dashboards
Automation	Reporting, Send Email, Java IF (Table), Table Row to Variable, Variable Loop Start, Loop End, Batch Processing, Workflow Executor	Automate workflows
Advanced/Integration	Python Script, R Script, JavaScript View, Spark Executor, Streaming Executor, Geospatial Analysis, Text Mining, Sentiment Analysis, Topic Modeling, Named Entity Recognition, Image Processing, Audio Processing, Video Processing	Extended capabilities

Easily Confused Node Pairs

Node A	Node B	Key Difference
Joiner	Concatenate	Joiner = merges on key (like SQL JOIN) Concatenate = stacks on top of each other
Row Filter	Row Splitter	Filter = keeps matching rows Splitter = splits into TWO datasets
Column Filter	Column Splitter	Filter = keeps selected columns Splitter = splits into TWO outputs
Model Writer	Model Reader	Writer = saves trained model Reader = loads model for predictions
Normalizer	One-Hot Encoding	Normalizer = scales numbers One-Hot = converts categories to numbers
Partitioning	Cross-Validation Loop	Partitioning = single train/test split CV Loop = multiple folds
Statistics	Data Explorer	Both compute descriptive stats — Statistics node is more commonly tested

KNIME Use Cases in the Module

Use Case	Key Nodes Used	Goal
Budget Monitoring Report	Reporting, Send Email, Java IF	Calculate money allocated, spent & remaining per project
Decision Tree	Decision Tree, Scorer, Partitioning	Predict property condition (high or low)
Visualization of Sales Data	Stacked Area Chart, Bar Chart, Pie/Donut Chart, Line Chart	Visualize sales trends over time
Credit Scoring	Cross-Validation, Scorer, Table Creator	Select best ML algorithm based on historical data
Data Blending & ETL	Joiner, Concatenate, Column Filter, GroupBy, JavaScript	Combine data from multiple sources; visualize avg age vs product
Automation Example	Send Email, Java IF (Table), Table Row to Variable	Automate report delivery to stakeholders

Key KNIME Concepts

Concept	Description
Metanodes	Group nodes together to simplify complex workflows
Components	Encapsulate reusable workflow segments (like functions)
Workflow Variables	Store & pass dynamic values between nodes
Workflow Coach	Suggests next nodes based on usage patterns
KNIME Hub	Repository for sharing & discovering workflows
KNIME Server	Scalable execution & sharing; supports collaboration
Data Apps	Create interactive applications from workflows
Workflow Annotations	Add explanatory notes to workflows for clarity
Parallelization	Run tasks concurrently on multiple machines/processors
ETL	Extract, Transform, Load — standard data pipeline process
Data Wrangling	Cleaning & transforming data for analysis
Data Blending	Combining data from multiple sources into one dataset
RESTful Web Services	Enable real-time predictions & app integrations

QUICK COMPARISON: All Three Tools

Aspect	Power BI	Python	KNIME
Type	BI & Visualization tool	Programming language	Visual analytics platform
Coding needed?	No (DAX for advanced)	Yes	No (drag & drop)
Primary strength	Dashboards & reporting	Flexibility & ML	End-to-end analytics
Data cleaning	Power Query Editor	Pandas	Various transform nodes
Visualization	Built-in visuals	Matplotlib / Plotly	Chart nodes & dashboards
Machine learning	AI Insights / visuals	Scikit-learn, TensorFlow	100+ ML nodes
Sharing/deployment	Power BI Service	Scripts/APIs	KNIME Server / Data Apps
Big Data support	Limited	Yes (with libraries)	Yes (Spark Executor)

MOST TESTED FACTS — Don't Miss These!

#	Fact
1	Power BI Desktop = create Power BI Service = publish/share/refresh Power BI Mobile = consume
2	Scheduled refresh = up to 8 times/day (Power BI Service)
3	Shared capacity = shared with others (free) Dedicated = fully yours (premium)
4	Building blocks of Power BI: Datasets, Reports, Dashboards (NOT Templates)
5	Dashboard = single canvas of tiles Report = multi-page canvas
6	Tile = individual visual box on a dashboard
7	DAX = calculated columns, measures & dynamic titles
8	Python Tuple = immutable List = mutable & ordered Set = no duplicates Dict = key-value
9	range(3) = 0,1,2 (starts at 0, excludes end number — most common trap!)
10	Matplotlib = charts/plots NumPy = numerical arrays Pandas = data manipulation
11	def = define function lambda = anonymous inline function
12	break = exit loop continue = skip iteration pass = do nothing placeholder
13	KNIME Joiner = combines on key (JOIN) Concatenate = stacks datasets
14	KNIME Normalizer = scale numbers One-Hot Encoding = categories to numbers
15	KNIME Scorer = evaluate ML model performance
16	KNIME Partitioning = split data into train/test sets
17	ETL = Extract, Transform, Load
18	KNIME Metanodes = group nodes Components = reusable segments
19	A lawn that never turns brown is plastic or poisoned 🌱 (just kidding — that's from your speech!)

Good luck! You've got this. 🚀