



**KaxaNuk**  
Sharing knowledge

# KN Hack Kick-Off & Intro to Investment Research

Session 1



# Content

- The Evolution of Investment Research
- Our Investment Research Process
- Common Strategies & Ideas
- Event Details

# The Evolution of Investment Research

Observation → Fundamentals → Risk → Markets → Behavior →  
Adaptation → Implementation

# Markets as Signals — Dow, Bachelier & Nelson



Why they matter:

**Treated markets as an information system before formal theory existed.**

Key work:

- Dow (1889–1902) — Wall Street Journal Editorials
- Bachelier (1900) — Théorie de la Spéculation
- Nelson (1903) — The ABC of Stock Speculation

Core ideas:

- Prices embed collective information
- Trends reflect human behavior
- Uncertainty can be modeled probabilistically

**“The market is a barometer of all conditions.”**



If prices move first... what are they reacting to?

# Intrinsic Value — Graham, Dodd & Damodaran



Why they matter:

**Transformed investing from price-watching into a research process based on value, discipline, and explicit assumptions.**

Key work:

- Graham & Dodd (1934) — Security Analysis
- Damodaran (1994) — Investment Valuation
- Damodaran (2001) — The Dark Side of Valuation

Core ideas"

- Value exists independently of price
- Valuation is a model, not a number

**"Valuation is a bridge between stories and numbers."**



If value exists... how do we  
allocate capital across many  
bets?

# Risk Comes First - Markowitz



Why he matters:

**Formalized portfolio construction as a mathematical research problem.**

Key papers:

- Markowitz (1952) — Portfolio Selection
- Markowitz (1959) — Portfolio Selection: Efficient Diversification of Investments

Core ideas:

- Diversification is measurable
- Risk lives in covariance
- Portfolios > individual assets

**“Investment research starts with how you allocate capital.”**



If risk can be measured...  
which risk deserves a  
reward?

# Pricing the Risk — Sharpe & Lintner



Why they matter:

**Separated market compensation from research skill.**

Key papers:

- Sharpe (1964) — Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk
- Lintner (1965) — The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets

Core ideas:

- Beta earns a premium, Alpha must be justified
- Performance attribution is born

**“Not all risk is rewarded.”**



If beta explains returns... what  
exactly are we being paid to  
research?



# Markets as a Discipline — Fama

Why he matters:

**Forced investment research to start from skepticism, not belief.**

Key papers:

- Fama (1970) — Efficient Capital Markets: A Review of Theory and Empirical Work

Core ideas:

- Prices reflect available information
- Alpha is rare
- Evidence beats intuition

**“Alpha must be proven — not assumed.”**



If markets are efficient... why  
does evidence refuse to  
behave?

# Risk Is Multi-Dimensional — Ross



Why he matters:

**Showed that returns must be driven by multiple independent sources of risk — even if we don't know what they are.**

Key paper:

- Ross (1976) — The Arbitrage Theory of Capital Asset Pricing

Core ideas:

- No-arbitrage
- Multiple risk factors
- Theory before measurement

**“Risk premia exist even when factors are unknown.”**



If returns come from multiple risks... what are they, and how do we measure them?

# Empirical Reality — Fama, French & Carhart



Why they matter:

**Showed that returns have structure, even in efficient markets.**

Key papers:

- Fama & French (1992) — The Cross-Section of Expected Stock Returns
- Fama & French (1993) — Common Risk Factors in the Returns on Stocks and Bonds
- Carhart (1997) — On Persistence in Mutual Fund Performance

Core ideas:

- Value, size, momentum
- Factor investing becomes scalable
- Research becomes systematic

**“Markets are mostly efficient — but not simple.”**



If factors persist... why are  
they so hard to live with?

# Human Behavior — Kahneman & Tversky



Why they matter:

**Explained why inefficiencies survive.**

Key paper:

- Kahneman & Tversky (1979) — Prospect Theory: An Analysis of Decision under Risk

Core ideas:

- Loss aversion
- Cognitive bias
- Asymmetric risk preferences

**“Risk is felt, not calculated.”**



If mistakes are obvious... why  
do they survive?

# Limits to Arbitrage — Shiller & Thaler



Why they matter:

**Explain why being right isn't enough.**

Key papers:

- Robert Shiller (1981) — Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?
- Shleifer & Vishny (1997) — The Limits of Arbitrage

Core ideas:

- Capital constraints
- Career risk
- Narrative-driven markets

**“Markets are stories with prices attached.”**



So markets are rational... and emotional. What framework survives both?



# Markets Adapt — Lo

Why he's the pivot:

**Reframes markets as evolving systems, not static models.**

Key papers:

- Lo (2004) — The Adaptive Markets Hypothesis

Core ideas:

- Strategies have life cycles
- Alpha is temporary
- Regimes matter

**“Efficiency is not a state — it’s a process.”**



If alpha decays... what does durable research look like?

# Research Discipline in Practice — Asness



Why he matters:

**Proved research survives markets through discipline.**

Key papers:

- Asness (1997) — The Interaction of Value and Momentum Strategies
- Asness, Moskowitz & Pedersen (2013) — Value and Momentum Everywhere

Core ideas:

- Factors persist but cycle
- Robustness beats intuition
- Behavioral foundations matter

**“The best strategies don’t look smart — they look resilient.”**



If everything has exposure...  
what is actually yours?

# The Operational Era — Paleologo



Why he matters:

**Showed that research without implementation is incomplete.**

Key work:

- Paleologo (2021) — Advanced Portfolio Management
- Paleologo (2025) — The Elements of Quantitative Investing

Core ideas:

- Residualization
- Factor stripping
- Clean alpha isolation

**“Research without residuals is noise.”**



If clean signals are rare... who finds them faster: humans or machines?

# AI & The Cross-Section — Kelly



Why he matters:

**Shows factor research evolves, not dies.**

Key paper:

- Kelly, Pruitt & Su (2019/2020) — Characteristics Are Covariances: A Unified Model of Risk and Return

Core ideas:

- Non-linear factor discovery
- Deep learning on returns
- Complexity scales research

**“The data still speaks — in higher dimensions.”**



So what happens when  
human intuition meets  
machine scale?

# Quant 4.0 — Guo, Wang, Ni & Shum



Why they matter:

**Research is no longer about finding isolated signals — it's about designing systems that continuously learn, adapt, and integrate human structure with machine scale.**

Key paper:

- Guo, Wang, Ni & Shum (2022) — Quant 4.0: Engineering Quantitative Investment with Automated, Explainable and Knowledge-driven Artificial Intelligence

Core ideas:

- Alpha lives in representations, not raw signals
- **Machines explore scale; humans impose structure**
- **Research is a system, not a model**

**“Modern investing is engineered, not discovered.”**



Investment research did not  
evolve by replacement.  
It evolved by addition.



**Every investment research process is *discretionary* at design and *systematic* at scale.**

**Quant thinking is what connects the two.**

# Our Investment Research Process

Strategy Blueprint

# The Synthesis of Evolution



We apply rigorous **scientific methods** to investing, combining **financial analysis, mathematical models, and computational algorithms** to uncover and exploit market inefficiencies with **consistent** and **superior risk-adjusted returns**.

- **Financial Analysis** = The legacy of Graham & Damodaran.
- **Mathematical Models** = The logic of Markowitz & Sharpe.
- **Computational Algorithms** = The engineering of Kelly & Guo.

# Strategy Blueprint

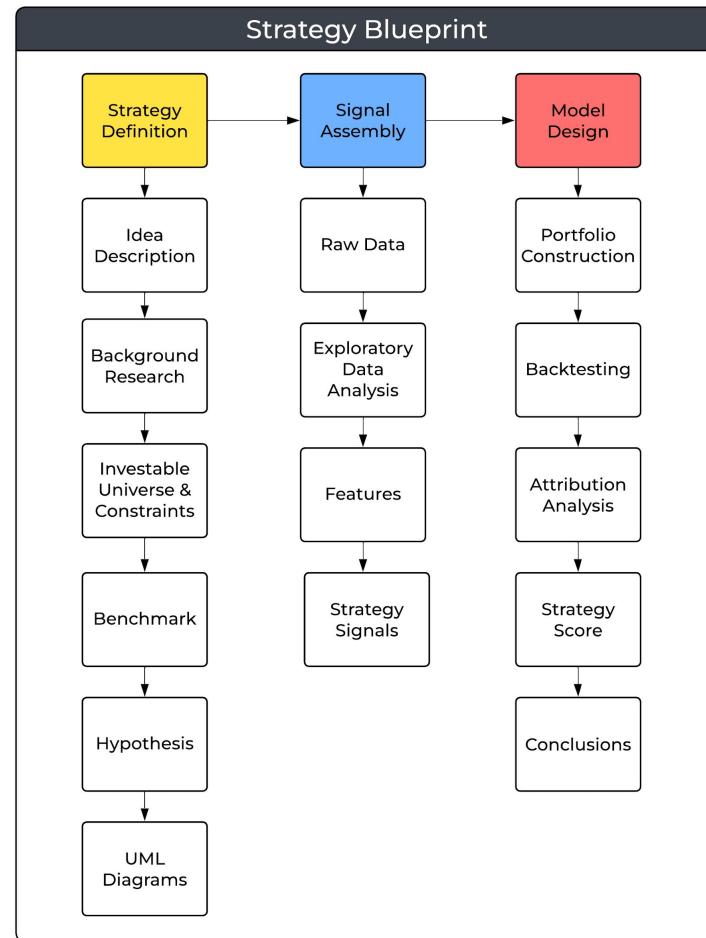


## The Process Flow:

**Strategy Definition:** Moving beyond "intuition" to a formal hypothesis.

**Signal Assembly:** Transforming raw data into predictive signals.

**Model Design:** Implementing portfolio construction selection, timing and sizing.





# Strategy Definition

**Moving beyond "intuition" to a formal hypothesis.**

## Key Components

- **Investable Universe:** Where specifically are we looking for Alpha? (Equities, ETFs, or Crypto).
- **The Benchmark:** How do we prove we are better than a benchmark portfolio?
- **The Hypothesis:** We don't just trade; we test against specific market failures:
  - **Market Inefficiency:** Information lag.
  - **Risk Premium:** Rewards for liquidity or volatility.
  - **Behavioral:** Exploiting overreaction patterns.
  - **Valuation:** Finding value mismatch.

# Signal Assembly



**Transforming raw data into predictive signals.**

## Tools of the Trade

- **Data Curator:** Building structured databases from market and fundamental APIs.
- **Exploratory Data Analysis:** Identifying price trends and return distributions before modeling.
- **Feature Engineering:** Creating robust signals (Momentum, Volatility, Value) that survive out-of-sample testing.
- **The Rule:** "To **avoid overfitting**, we keep features constant until the conclusion of the research." Use your hypothesis idea to avoid data mining.

# Model Design



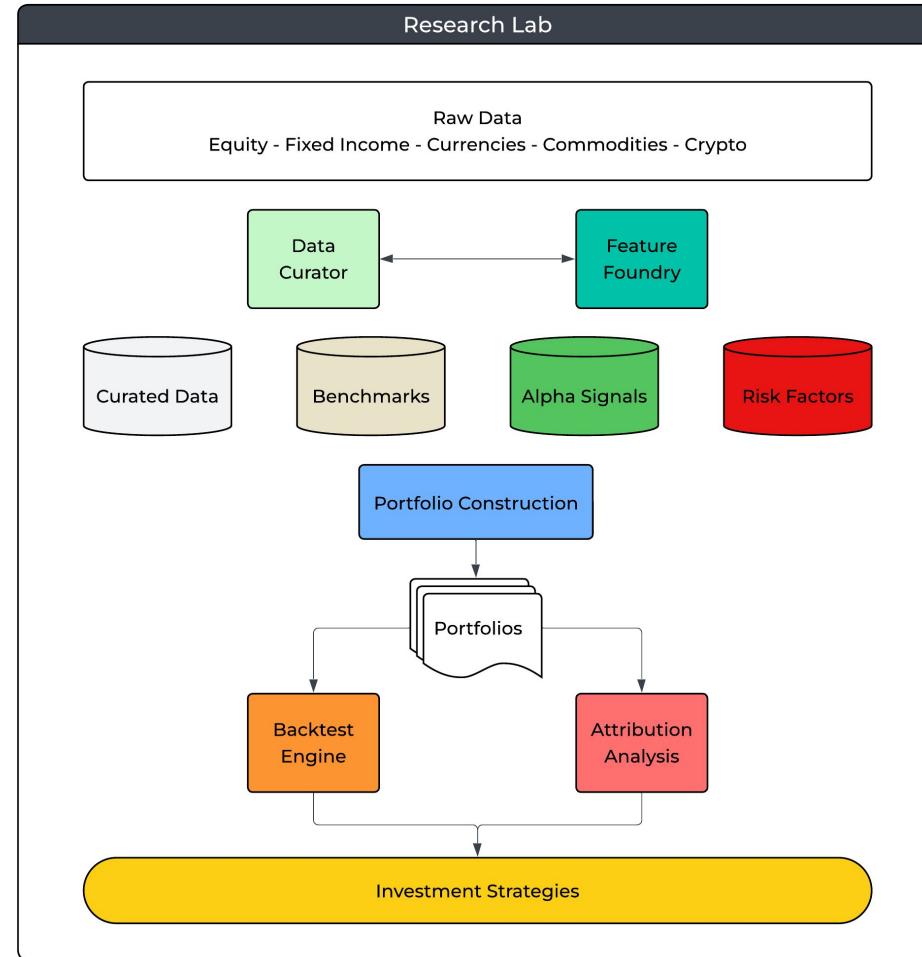
## Implementing portfolio construction selection, timing and sizing.

Rigorous Implementation:

- **Constraints:** Respecting target holdings (e.g., 35) and weight limits (e.g., 20%).
- **Backtest Engine:** **Fully auditable Python-based process** accounting for slippage, fees, and commissions.
- **Attribution Analysis:** Decomposing returns to **prove the value added comes from Skill**, not just factor exposure.
- **The Final Output:** The **Strategy Score** — A quantitative verdict on implementability.

# Research Lab

Uncover actionable ideas across asset classes, regions, and sectors.



# Common Strategies Ideas

## Brainstorming

# Common Strategies and Investment Instruments

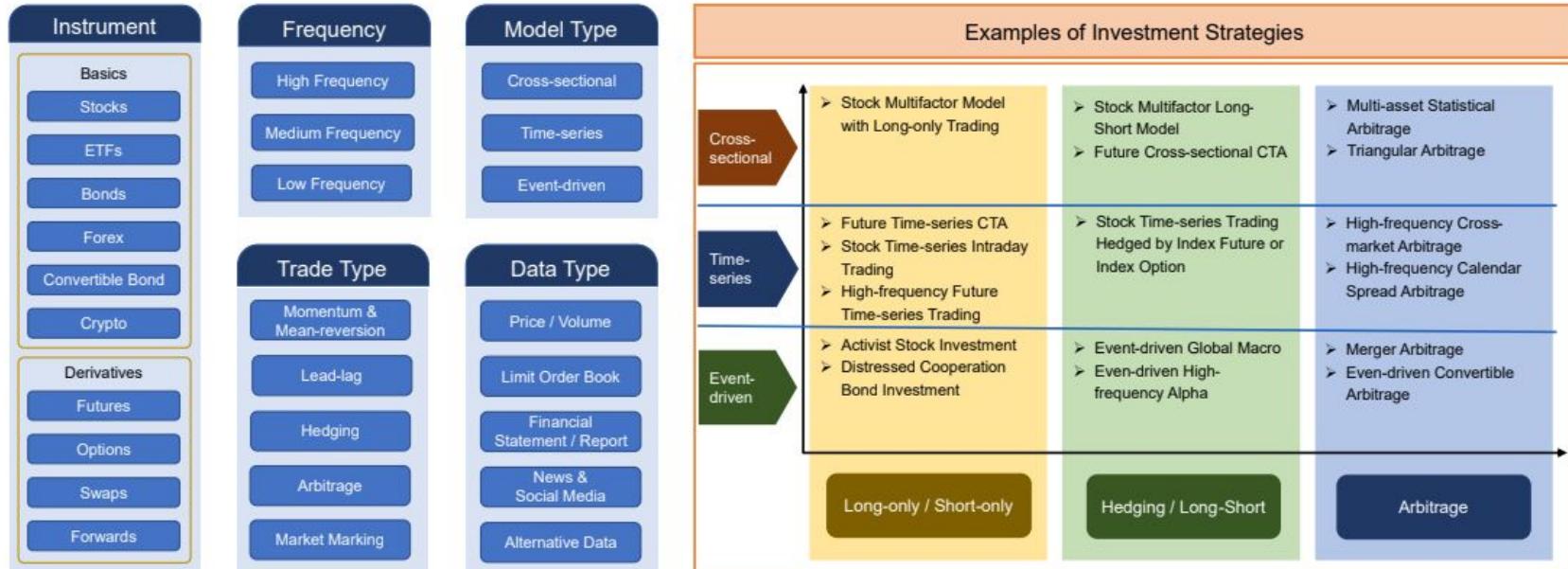



Figure 3: Classification of common strategies and investment instruments.



# Popular Machine Learning Algorithms

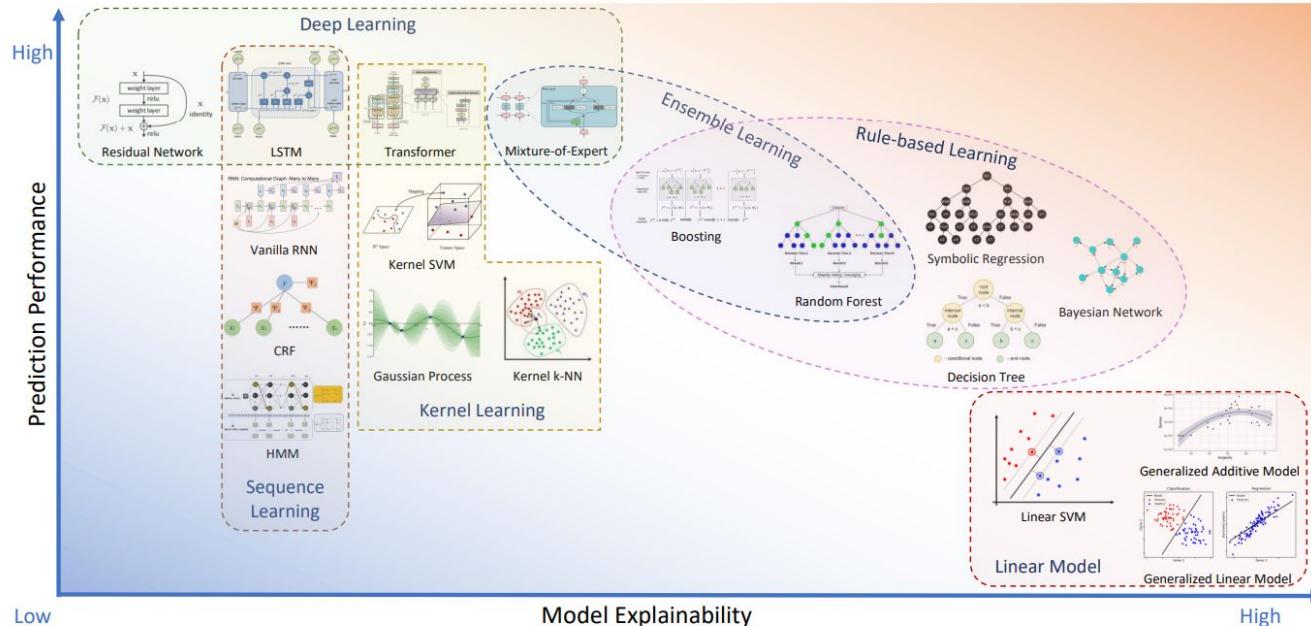


Figure 20: Comparison of popular machine learning algorithms according to prediction performance and model explainability. Part of this figure is cited from [130, 131, 132].



# The Quality Value

- **Research Lineage:** Benjamin Graham + Aswath Damodaran.
- **The Concept:** Systematic screening for "Wonderful Companies at Fair Prices."
- **The Signal:**
  - **Value:** Low P/E or EV/EBITDA (The "Cheap" factor).
  - **Quality:** High Return on Equity (ROE) and Low Debt/Equity (The "Safety" factor).
- **The Hypothesis:** Markets overreact to bad news for good companies (Behavioral).
- **Data Needed:** Quarterly Fundamentals + Daily Closing Prices.
- **Frequency:** Monthly rebalancing.

# Multi-Asset Trend Following



- **Research Lineage:** Charles Dow + Cliff Asness.
- **The Concept:** "The Trend is your friend." If an asset has been rising for 6–12 months, it is likely to continue.
- **The Signal:**
  - **Time-Series Momentum:** Comparing an asset to its own past (e.g., is Price > 200-day Moving Average?).
  - **Cross-Sectional Momentum:** Comparing assets to each other (e.g., buy the top 10% of ETFs by performance).
- **The Hypothesis:** Delayed reaction to information and "herding" behavior (Lo's Adaptive Markets).
- **Data Needed:** Daily/Weekly Closing prices for Stocks, Bonds, Commodities (ETFs).
- **Frequency:** Weekly or Monthly rebalancing.

# Event-Driven: The Earnings Drift



- **Research Lineage:** Eugene Fama (Testing Efficiency).
- **The Concept:** Exploiting the Post-Earnings Announcement Drift (PEAD).
- **The Signal:**
  - Identify "**Earnings Surprises**".
  - Buy companies with a significant positive surprise.
- **The Hypothesis:** Market prices are efficient but not instant. It takes weeks for investors to fully process a fundamental change in a company's trajectory.
- **Data Needed:** Earnings dates, fundamentals, and Daily Prices.
- **Frequency:** Mid-frequency (Trades held for 10–60 days).



# The Low Volatility Anomaly

- **Research Lineage:** Harry Markowitz + William Sharpe.
- **The Concept:** CAPM says "higher risk = higher return," but historical data often shows that Low Volatility stocks outperform high-risk stocks over long periods.
- **The Signal:**
  - Identify stocks with the **lowest 36-month realized volatility or Beta**.
  - Invert the weights (Risk Parity).
- **The Hypothesis:** Leverage constraints and lottery-preference bias (Investors overpay for "exciting" stocks and ignore "boring" ones).
- **Data Needed:** Daily Closing prices (to calculate variance/covariance).
- **Frequency:** Quarterly or Semi-annual rebalancing.

# Event Details

The Challenge

# Are You Ready to Test Your Skills?



We are excited to announce the **KN Hack Research Challenge**, an opportunity for aspiring quants, data scientists, and finance enthusiasts to showcase their analytical prowess and innovative thinking!

Whether you're a student, a professional, or simply passionate about quantitative finance, this challenge is for you!

# Challenge Overview



Participants will be tasked with solving a real-world **investment strategy** applying rigorous scientific methods to investing, combining **financial analysis, mathematical models, and computational algorithms**.



## Key Details

**Training Sessions:** Monthly online session starting on January 2026 until May

**Registration Deadline:** May 31st 2026

**Event:** June 11th to 13th 2026

**Location:** Puebla, Mexico

**Eligibility:** Open to teams of 2 to 4 members

# Judging Criteria



**Innovation:** Originality and creativity in approach

**Technical Rigor:** Use of appropriate quantitative methods

**Clarity:** Quality of presentation and explanation of findings

**Practicality:** Applicability of the solution to real-world scenarios

**Performance:** Risk adjusted returns and consistency

**Overfitting:** Data segmentation, walk-forward analysis, cross-validation

## Why Participate?



**Enhance Your Skills:** Gain hands-on experience in quantitative analysis and problem-solving.

**Network with Professionals:** Connect with industry experts and participants.

**Win Prizes:** Compete for exciting rewards that could kickstart your career in finance.



# 3 Topics

## Equities: Stock Picking

- Generate alpha through high-conviction stock selection.
- Deploy quantitative, technical, or fundamental strategies.
- Outperform the benchmark within a designated investment universe.



## Multi-Asset: ETF Allocation

- Construct robust portfolios across global equities, bonds, real estate, and commodities.
- Test skills in dynamic asset allocation and risk management.
- Design strategies that optimize returns beyond traditional models.



## Crypto: Digital Assets

- Navigate the volatility of the digital asset economy.
- Apply strategies to top-tier cryptocurrencies.
- Capture growth across the broader crypto ecosystem.



# Disclaimers



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