

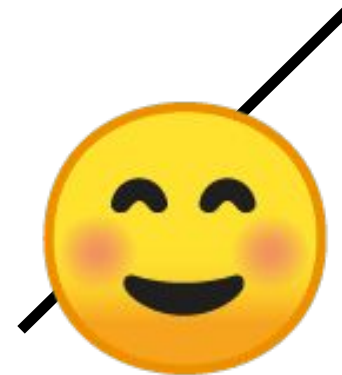


# Analysis Evening Algorithmic Trading

# Table of Contents

- 1) What exactly is an algorithm?
- 2) The essential parts you will need to compose your very own algorithm
- 3) How to test your algorithm

**LET'S GO**



# What is an Algorithm?

- “In mathematics and computer science, an algorithm is an unambiguous specification of how to solve a class of problems. Algorithms can perform calculation, data processing, automated reasoning, and other tasks.”

- source: <https://en.wikipedia.org/wiki/Algorithm>

- “A procedure for solving a mathematical problem in a finite number of steps that frequently involves repetition of an operation”

- source: <https://www.merriam-webster.com/dictionary/algorithm>

What is an Algorithm?

# SHORTER

# What is an Algorithm?

-Attempt #2

-A step-by-step procedure for solving a problem or accomplishing some end

What is an Algorithm?

**SHORTE**

**R**

What is an Algorithm?

Procedure for solving a problem??

What is an Algorithm?

**SHORTE**

**R**





Handwritten mathematical formulas and diagrams on a chalkboard background:

- $x^2 - 4x + 5$
- $\pm \sqrt{(-4)^2 - 4(1)(5)}$
- $\frac{4 \pm \sqrt{16 - 20}}{2}$
- $\frac{4 + 2i}{2}$
- $\frac{4 - 2i}{2}$
- $\pi = 3.14159$
- $1 - 3(x+1)$
- Diagram with a circle and arrows labeled "POLICY STRATEGY" and "error".

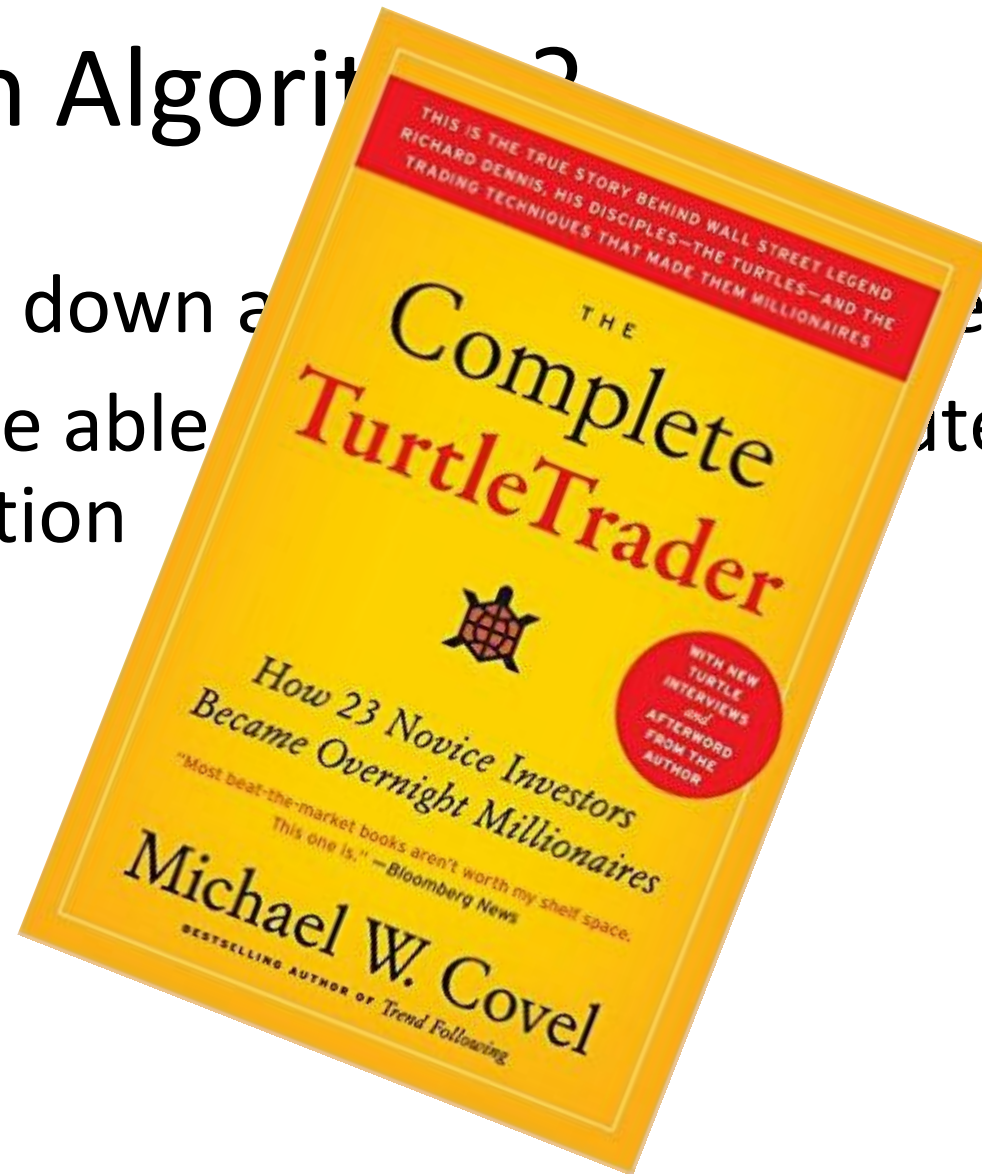
vpro

OMROEP  
**MAXIM**

# STEPS!!!

# What is an Algorithm

- I could write down a
- You would be able to implement it to you
- You would be able to “water” or
- implementation



# The Essential Parts

- An trading algorithm needs to be complete
  - i.e. every possible scenario must be accounted for
- What is a complete trading system?

# The Essential Parts

-What is a “complete system”?

- 1) Markets- What to buy or sell
- 2) Position Sizing – How much to buy or sell
- 3) Entries – When to buy or sell
- 4) Stops – When to get out of a losing position
- 5) Exits – When to get out of a winning position
- 6) Tactics – How to buy or sell

# Markets - What to buy or sell

- Not much to tell you here
- Use your knowledge of fundamental analysis to select a pool of interesting stocks!

# Position Sizing – How much to buy or sell

-Let's say we have a big pile of cash



-How are we going to divide this?

# Position Sizing – How much to buy or sell

- Approach #1
- Divide it equally
- Sounds like a reasonable suggestion, right?

# Position Sizing – How much to buy or sell

- Approach #2
- Take the volatility of stocks into account
- Average True Range



# Position Sizing – How much to buy or sell



# Position Sizing – How much to buy or sell

**V.S.**

# Position Sizing – How much to buy or sell



# Position Sizing – How much to buy or sell

-ATR values:

-AAPL: 1.7

-WRK: 0.4

-Pick a reference stock (WRK)

-We invest 10000 euro in WRK, how much should we invest in AAPL taking volatility in account?

$$-\text{€}_{\text{Stock}} = (\text{Investment} \times \text{ATR}_{\text{Ref}}) / \text{ATR}_{\text{Stock}}$$

$$-\text{€}_{\text{AAPL}} = (10000 \times 0.4) / 1.7 = 2353 \text{ euro}$$

# Entries – When to buy or sell

-Got to have well defined entry conditions

-Technical Analysis

- 1) Baseline (Moving Average)
- 2) Trend Confirmation Indicator (or 2)
- 3) Volume Indicator

# Stops – When to get out of a losing position

## -Technical Stop Loss

- Fixed Size

- Trailing

- ATR Trailing

- Exit indicator

## -Fundamentals no longer good, close positions?

# Exits – When to get out of a winning position

-Same story as stops

-Technical Take Profit

- 1) Fixed Size
- 2) ATR
- 3) Multiple Take Profits on higher levels
- 4) Exit indicator

-Fundamentals no longer good,  
close positions?

# Tactics – How to buy or sell

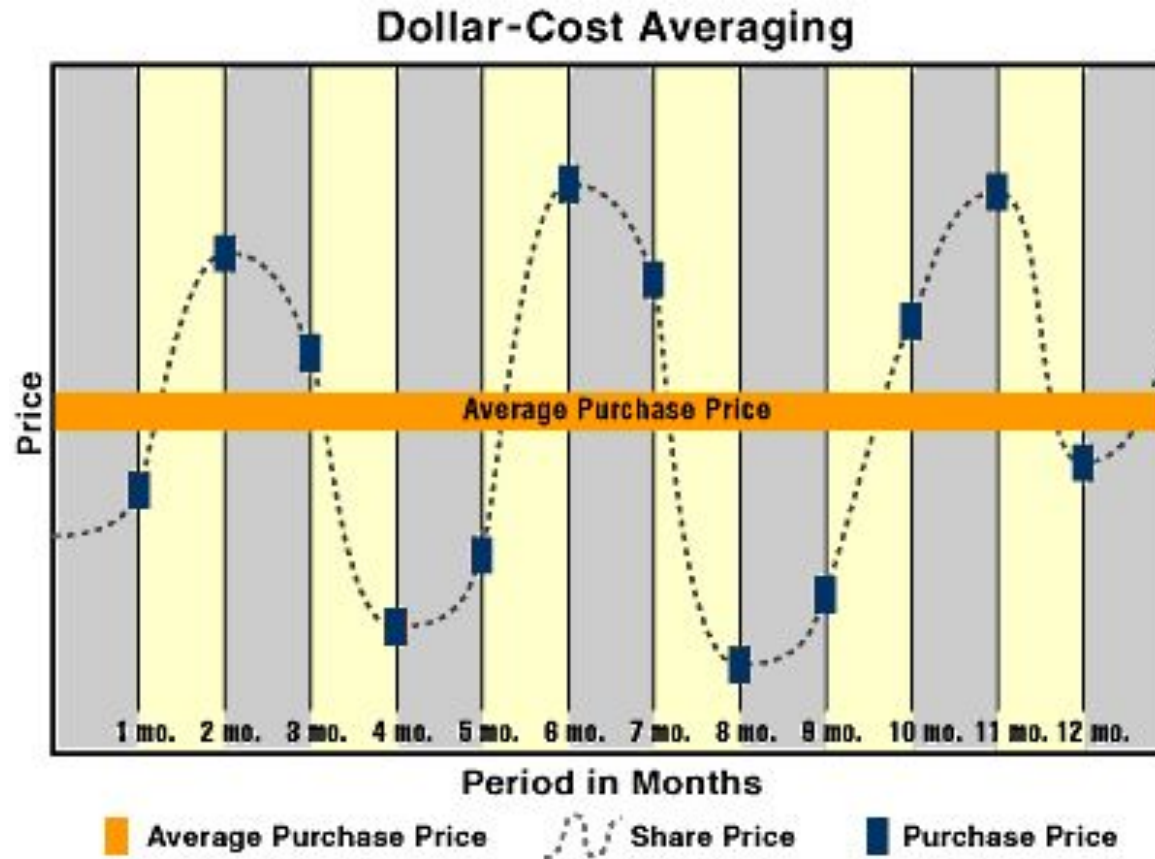
-Basic tactics:

- Single entries

- Dollar(in our case Euro)-Cost Averaging



# Tactics – How to buy or sell



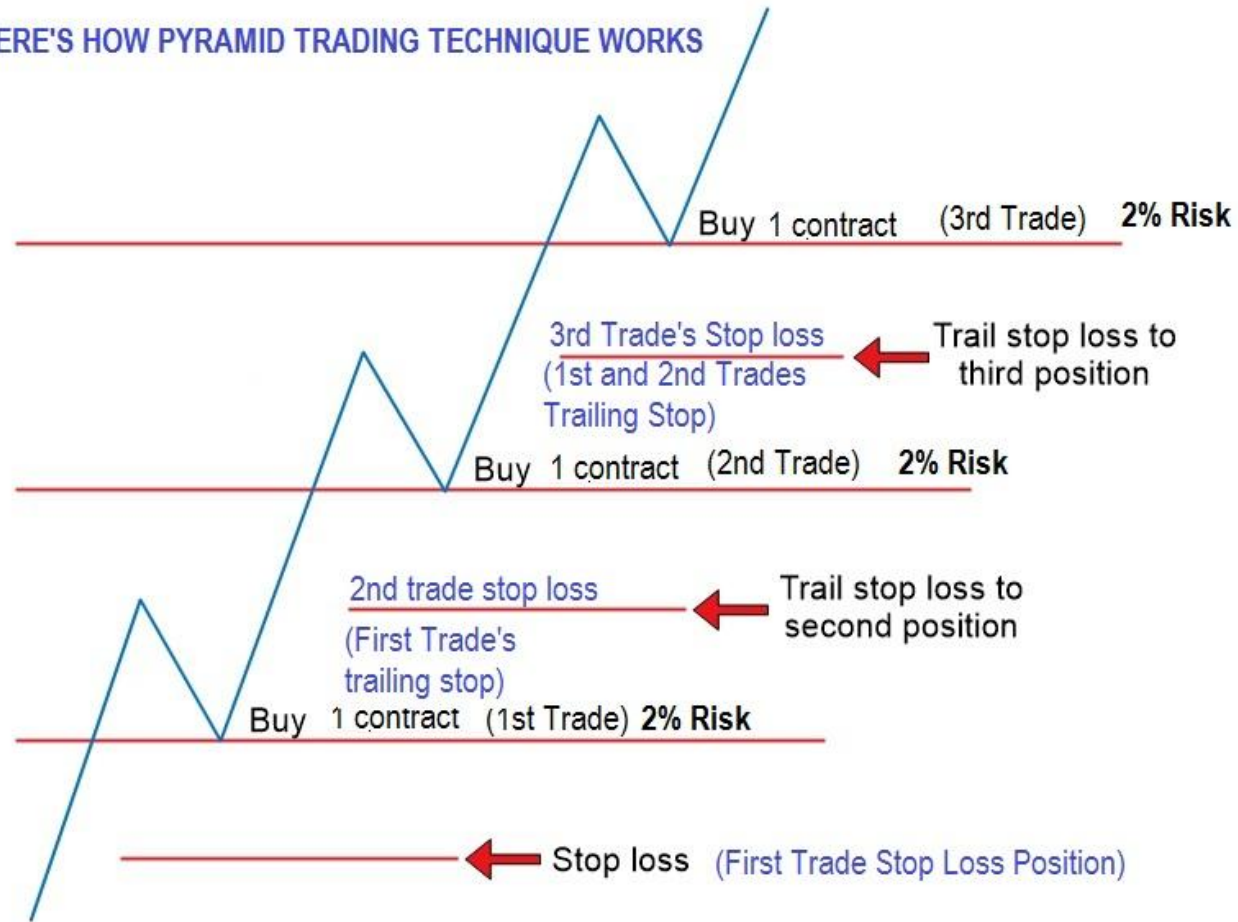
# Tactics – How to buy or sell

## -Basic tactics:

- Single entries
- Dollar(in our case Euro)-Cost Averaging
- Average Down
- Average Up
- Pyramiding

# Tactics – How to buy or sell

HERE'S HOW PYRAMID TRADING TECHNIQUE WORKS



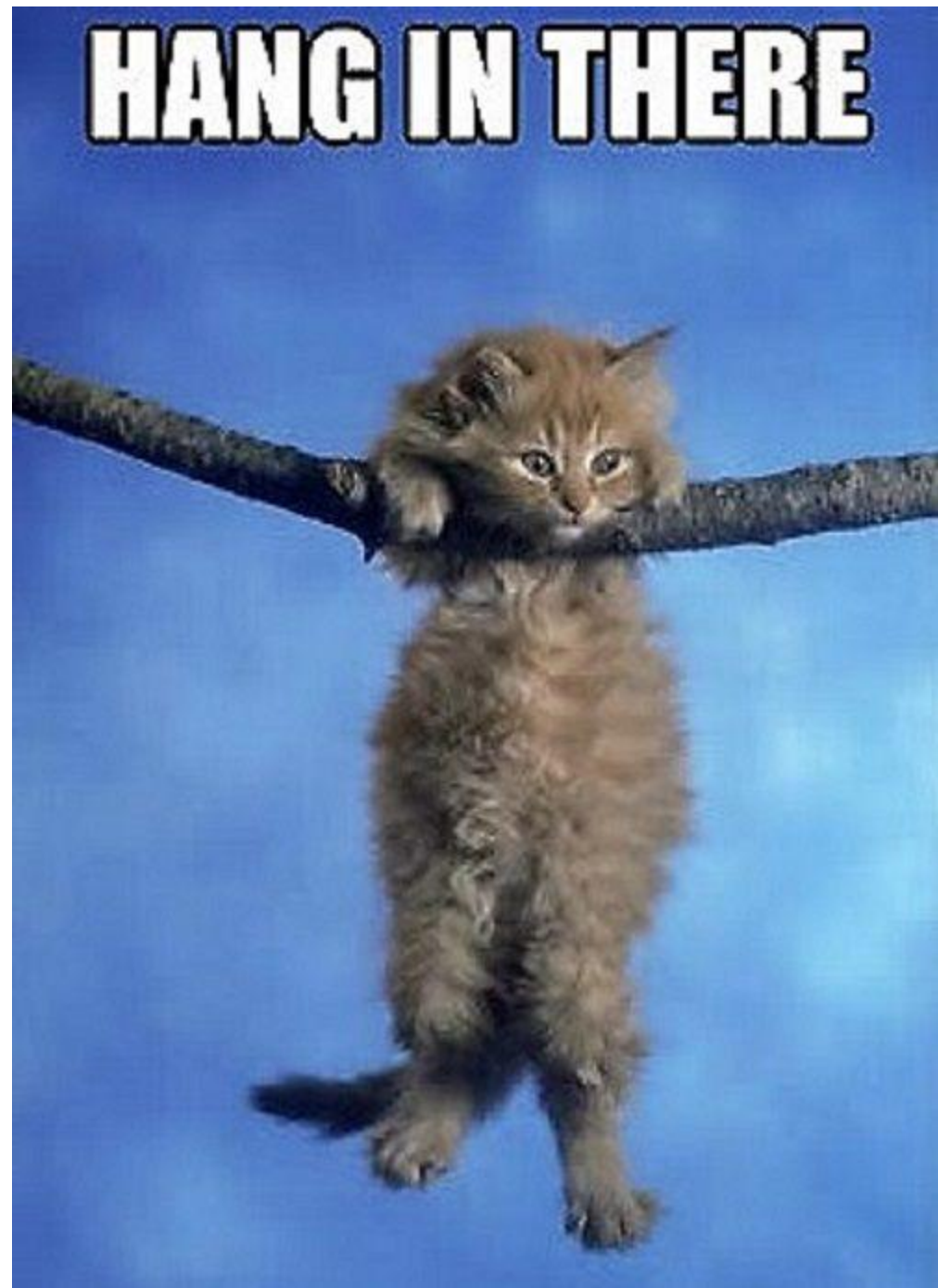
# Tactics – How to buy or sell

-Basic tactics:

- Single entries
- Average Down
- Average Up
- Pyramiding

-Investopedia is your best friend!

$\langle = X_f - X$   
 $V = V_f - V_i$   
 $\sqrt{\frac{T}{P}} \quad \alpha = \frac{V}{R}$   
 $x^2 - 4x + 5$   
 $\frac{(-4) \pm \sqrt{(-4)^2 - 4(1)(5)}}{2(1)}$   
 $\frac{-4 \pm \sqrt{16 - 20}}{2}$   
 $\frac{-4 \pm \sqrt{-4}}{2}$   
 $\frac{-4 \pm 2i}{2}$   
 $\frac{-4 + 2i}{2}$   
 $\frac{-4 - 2i}{2}$   
POLICY STRATEGY  
YEAR  
 $1) - 3(x+1)$



# Testing an Trading Algorithm

- Manual back testing/forward testing
  - Hard to do for fundamental analysis
  - Doable for technical analysis
- Coolest would be to have an actual computer program to run on big sets of market data

# Workshop

- Let's actually start building your own algorithm
- Workshop description and slides in the drive:

<http://bit.ly/2xEeFsv>