PSEDYS | TECHNICAL REFERENCE MANUAL V3.0

SH / SL — Swing High and Swing Low

Technical Reference Manual v1.0

PSEDYS | Complete Edition
Definition · Lookback N · HH/HL/LH/LL · Market Structure · Pivot Detection · MTF · PSEDYS

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1. What are Swing High/Low? Concept

Swing High (SH): local maximum point — a High greater than the Highs of the bars to its left and right over N bars.

Swing Low (SL): local minimum point — a Low lower than the Lows of the bars to its left and right over N bars.

Swing High and Swing Low are the **foundations of market structure** — they define bullish (HH/HL) or bearish (LH/LL) context and serve as anchor points for Fibonacci, Order Blocks, BOS, CHoCH.

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2. Mathematical Definition — Lookback N

```
Swing High at bar[i] (lookback=N):
  High[i] = max(High[i-N .. i+N])
  → High[i] is the highest among N bars to the left AND N bars to the right

Swing Low at bar[i] (lookback=N):
  Low[i] = min(Low[i-N .. i+N])
  → Low[i] is the lowest among N bars to the left AND N bars to the right
```

Standard Lookback: N=2 (simple, noisy) or N=5 (moderate) or N=10 (smooth, fewer SH/SL)

Consequence: Swing High/Low at bar[i] can only be confirmed after N bars to the right → there is an **N-bar lag** in real-time detection.

Example (N=2):

```
Highs: [100, 103, 108, 105, 107]
SH at bar 3 (H=108): High[3]=108 > High[2]=103, High[4]=105, High[1]=100, High[5]=107 ✓
→ Swing High at 108
```

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3. Market Structure: HH/HL/LH/LL

```
Bullish Trend (bullish structure):
  HH = Higher High: SH higher than the previous SH → buyers push higher
  HL = Higher Low: SL higher than the previous SL → sellers no longer push lower

  Pattern: SL1 → SH1 → SL2(>SL1) → SH2(>SH1) = valid bullish trend

Bearish Trend (bearish structure):
  LH = Lower High: SH lower than the previous SH → buyers no longer reach higher
  LL = Lower Low: SL lower than the previous SL → sellers push lower

  Pattern: SH1 → SL1 → SH2(<SH1) → SL2(<SL1) = valid bearish trend

Mixed Structure / Transition:
  HH + LL (without HL/LH): ambiguous structure
  BOS = Break of Structure (exceeding previous swing)
  CHoCH = Change of Character (transition from bullish to bearish or vice versa)
```

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4. Automatic Identification

```
def find_swing_highs(highs, lookback=5):
    """Returns indices where Swing High exists."""
    sh_indices = []
    for i in range(lookback, len(highs)-lookback):
        is_sh = all(highs[i] > highs[i-j] for j in range(1, lookback+1)) and \
                all(highs[i] > highs[i+j] for j in range(1, lookback+1))
        if is_sh:
            sh_indices.append(i)
    return sh_indices

def find_swing_lows(lows, lookback=5):
    sl_indices = []
    for i in range(lookback, len(lows)-lookback):
        is_sl = all(lows[i] < lows[i-j] for j in range(1, lookback+1)) and \
                all(lows[i] < lows[i+j] for j in range(1, lookback+1))
        if is_sl:
            sl_indices.append(i)
    return sl_indices
```

Real-time Lag: You don't know that bar[i] is SH until after N bars to the right → real-time usage requires a larger lookback to the left.

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5. Usage in Technical Analysis

```
1. Fibonacci Retracement: draw from SL → SH (bull) or SH → SL (bear)
2. Order Block: last opposite bar before a surpassed SH/SL
3. BOS (Break of Structure): Close > previous SH = bullish BOS
4. CHoCH: reversed structure (from HH/HL to LH/LL or vice versa)
5. Supply/Demand Zones: zones at major SH/SL
6. Target: previous SH = TP for Long; previous SL = TP for Short
7. SL position: below the last SL (Long) / above the last SH (Short)
```

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6. Trading Signals

```
Bullish structure (HH+HL pattern):
  Retracement to HL (Higher Low) = opportunity entry Long
  SL below HL → TP at the last HH or extension

Bearish structure (LH+LL pattern):
  Bounce at LH (Lower High) = opportunity entry Short
  SL above LH → TP at the last LL or extension

Invalidated structure:
  Close below the last HL in bullish structure → possible CHoCH → reduce Long
  Close above the last LH in bearish structure → possible CHoCH → reduce Short
```

7. MTF and PSEDYS

```
Swing points on higher TF (4H, 1D) = major macro levels
Swing points on lower TF (5M, 15M) = intraday structure

MTF: Swing High 4H = major target for 1H trades
     Swing Low 4H = SL reference for 1H trades

PSEDYS usage:
- Automatic SH/SL detection for Fibonacci anchor
- Real-time BOS/CHoCH monitoring
- Target calculation (TP at previous SH)
```

```
# Last SH as TP for Long
last_sh = max(swing_highs[-3:], key=lambda x: x['price'])
tp_long = last_sh['price']

# SL below the last HL
last_hl = [sl for sl in swing_lows if sl['price'] > prev_sl_price][-1]
sl_long = last_hl['price'] - atr * 0.5
```

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8. Practical Exercises

Exercise 1: Bullish structure with HL formed

Situation: BTC. SH1=62000, SL1=58000, SH2=65000, SL2=60500. Pattern: HH+HL = bullish structure. Price at 61000 (retracement towards HL zone).

Answer: Entry Long at HL zone. SL2=60500 = Higher Low → valid bullish structure. Entry Long at 60500-61500 (HL zone). SL below SL2 = 60000. TP = last HH=65000 or next estimated SH. R:R: (65000-61000)/(61000-60000) = 4 — excellent.

Exercise 2: Close below the last HL — possible CHoCH?

Situation: ETH in bullish structure (HH+HL). Last HL = 1850. Current bar Close = 1820 (below 1850).

Answer: CHoCH warning — reduce position. Close below the last HL = compromised bullish structure. Not a confirmed CHoCH yet (requires LH formation). Reduce position by 50%. Tight SL at 1820 (current Close). Wait: if price quickly returns above 1850 = false break (possible liquidity sweep). If it forms LH (bounce lower than SH2) + Close below 1820 = confirmed CHoCH → complete exit.

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9. Cheat Sheet

Concept	Rule
Swing High	`High[i] = max(High[i-N..i+N])`
Swing Low	`Low[i] = min(Low[i-N..i+N])`
Standard Lookback	N=5 (moderate)
Detection Lag	N bars to the right
HH	SH > previous SH → bullish
HL	SL > previous SL → confirmed bullish
LH	SH < previous SH → bearish
LL	SL < previous SL → confirmed bearish
Bull Trend	HH + HL pattern
Bear Trend	LH + LL pattern
Entry Long	Retracement to HL
Entry Short	Bounce at LH
SL Long	Below the last SL (HL)
TP Long	Last SH or extension

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