



## Algorithm Trading Tutorial Presentation

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(a) What algorithm do you think is being used in this case?

Time of day	Total Market Volume	Avg. Traded Price	No. of shares Mr.A sold (& price)
9:00 am	100,000	\$4.50	10,000 (@ \$4.40)
10:00 am	50,000	\$4.30	5,000 (@ \$4.30)
11:00 am	30,000	\$4.20	3,000 (@ \$4.20)
12:00 am	30,000	\$4.10	3,000 (@ \$4.00)

The algorithm used is **VWAP**.

(b) Compute the implementation shortfall at each hour of the day (starting from 9:00am – 12:00pm) and state the assumptions you have made.

### Assumptions:

- Ideal VWAP implemented is for 10% of market volume
- Volume excludes own trades

### Implementation Shortfall

= Profit Ideal – Profit Actual

= BM Volume (BMP - CP) – Actual Volume (AP - CP)

(b) Compute the implementation shortfall at each hour of the day (starting from 9:00am – 12:00pm) and state the assumptions you have made.

Time of day	Implementation Shortfall	Workings
9:00 am	1,200	$10000 (4.50 - 4.50) - 10000 (4.38 - 4.50)$
10:00 am	1,300	$15000 [(100000 * 4.50 + 50000 * 4.30) / 150000 - 4.30] - 15000 [(10000 * 4.38 + 5000 * 4.28) / 15000 - 4.30]$
11:00 am	1,360	$18000 [(100000 * 4.50 + 50000 * 4.30 + 30000 * 4.20) / 180000 - 4.20] - 18000 [(10000 * 4.38 + 5000 * 4.28 + 3000 * 4.18) / 18000 - 4.20]$
12:00 am	1,720	$21000 [(100000 * 4.50 + 50000 * 4.30 + 30000 * 4.20 + 30000 * 4.10) / 210000 - 4.10] - 21000 [(10000 * 4.38 + 5000 * 4.28 + 3000 * 4.18 + 3000 * 3.98) / 21000 - 4.10]$

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(C) What algorithm do you think is being used in this case?

Time of day	Total Market Volume	Avg. Traded Price	No. of shares Mr.A sold (& price)
9:00 am	100,000	\$4.50	7,000 (@ \$4.40)
10:00 am	50,000	\$4.30	7,000 (@ \$4.30)
11:00 am	30,000	\$4.20	6,000 (@ \$4.20)
12:00 am	30,000	\$4.10	1,000 (@ \$4.00)

The algorithm used is **TWAP (Upper Limit)**.

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(d) Compute the implementation shortfall at each hour of the day (starting from 9:00am – 12:00pm) and state the assumptions you have made.

**Assumptions:**

- Upper volume limit of 7,000 shares per hour

**Implementation Shortfall**

= Profit Ideal – Profit Actual

= BM Volume (BMP - CP) – Actual Volume (AP - CP)

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(d) Compute the implementation shortfall at each hour of the day (starting from 9:00am – 12:00pm) and state the assumptions you have made.

Time of day	Implementation Shortfall	Workings
9:00 am	840	7000 (4.50 - 4.50) - 7000 (4.38 - 4.50)
10:00 am	980	14000[(7000 * 4.50 + 7000 * 4.30) / 14000 - 4.30] - 14000 [(7000 * 4.38 + 7000 * 4.28) / 14000 - 4.30]
11:00 am	1,100	20000[(7000 * 4.50 + 7000 * 4.30 + 6000 * 4.20) / 20000 - 4.20] - 20000 [(7000 * 4.38 + 7000 * 4.28 + 6000 * 4.18) / 20000 - 4.20]
12:00 am	1,220	21000 [(7000 * 4.50 + 7000 * 4.30 + 6000 * 4.20 + 1000 * 4.10) / 21000 - 4.10] - 21000 [(7000 * 4.38 + 7000 * 4.28 + 6000 * 4.18 + 1000 * 3.98) / 21000 - 4.10]