

It is required to generate 5 best bid levels and 5 best offer levels for the 48-hour project. This document shows how to use provided per order data to generate best bid and offer.

Case 1: NEW orders

Suppose the order book begins with empty status.

Orders			Bid Ask				Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd

The first order entered is order ID: 1, order side: BUY, order category: NEW, price: 9.6, quantity 5

Orders			Bid Ask				Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd
		5	5	9.6					

The best bid and best offer is: best bid price 9.6, best bid quantity 5, best offer price: NA, best offer quantity: NA

The second order entered is order ID: 1, order side: SELL, order category: NEW, price: 9.7, quantity 15

Please note that order ID is not unique. We can only identify an order with both order ID and order side.

Orders			Bid Ask				Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd
		5	5	9.6	9.7	15	15		

The best bid and best offer is: best bid price 9.6, best bid quantity 5, best offer price: 9.7, best offer quantity: 15

Case 2: CANCEL orders

The first order entered is order ID: 1, order side: BUY, order category: NEW, price: 9.6, quantity 4

The second order entered is order ID: 2, order side: BUY, order category: NEW, price: 9.5, quantity 6

The third order entered is order ID: 2, order side: SELL, order category: NEW, price: 9.7, quantity 5

The fourth order entered is order ID: 8, order side: SELL, order category: NEW, price: 9.7, quantity 10

Orders			Bid		Ask		Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd
		4	4	9.6	9.7	15	5	10	
		6	6	9.5					

The best bid and best offer is: best bid price 9.6, best bid quantity 4, best offer price: 9.7, best offer quantity: 15

The fifth order entered is order ID: 1, order side: BUY, order category: CANCEL, price: 9.6, quantity 4

Orders			Bid		Ask		Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd
		6	6	9.5	9.7	15	5	10	

The best bid and best offer is: best bid price 9.5, best bid quantity 6, best offer price: 9.7, best offer quantity: 15

The sixth order entered is order ID: 2, order side: SELL, order category: CANCEL, price: 9.7, quantity 5

Orders			Bid		Ask		Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd
		6	6	9.5	9.7	10	10		

The best bid and best offer is: best bid price 9.5, best bid quantity 6, best offer price: 9.7, best offer quantity: 10

Case 3: TRADE

The first order entered is order ID: 1, order side: BUY, order category: NEW, price: 9.6, quantity 4

The second order entered is order ID: 2, order side: BUY, order category: NEW, price: 9.5, quantity 6

The third order entered is order ID: 8, order side: SELL, order category: NEW, price: 9.7, quantity 5

The fourth order entered is order ID: 2, order side: SELL, order category: NEW, price: 9.7, quantity 10

Orders			Bid Ask				Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd
		4	4	9.6	9.7	15	5	10	
		6	6	9.5					

The best bid and best offer is: best bid price 9.6, best bid quantity 4, best offer price: 9.7, best offer quantity: 15

The fifth order entered is order ID: 8, order side: SELL, order category: TRADE, price: 9.7, quantity 4

Orders			Bid Ask				Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd
		4	4	9.6	9.7	11	1	10	
		6	6	9.5					

The best bid and best offer is: best bid price 9.6, best bid quantity 4, best offer price: 9.7, best offer quantity: 11

The sixth order entered is order ID: 1, order side: BUY, order category: TRADE, price: 9.6, quantity 4

Orders			Bid Ask				Orders		
3rd	2nd	1st	Quantity	Price	Price	Quantity	1st	2nd	3rd
		6	6	9.5	9.7	11	1	10	

The best bid and best offer is: best bid price 9.5, best bid quantity 6, best offer price: 9.7, best offer quantity: 11

Useful links

<https://www.investopedia.com/terms/b/bestbid.asp>

<https://www.investopedia.com/terms/b/bestask.asp>

<https://www.cmegroup.com/education/market-by-order-mbo.html>