

Frontend Assessment



BestEx Research trades on multi-assets to generate alpha, with one such asset being Fx. In this assignment, we will focus on integrating Fx into our frontend dashboard and helping end-users track currency pair prices, orders, funds, and positions taken during the day. The following is a list of currency pairs we would like to include in our watchlist, along with their corresponding current market close prices: USDINR (82.5500), USDCNH (6.88650), EURUSD (1.06641), USDJPY (131.830), USDGBP (0.82122).

To complete this assessment, it is essential to have some knowledge of how prices change in the Fx market, orders, and positions. Here are some critical pieces of information:

1. **Circuit Limits:** These are limits set by stock exchanges to restrict the maximum percentage movement of a stock in a single day. For our currency pairs, the lower circuit limit is -5%, and the upper circuit limit is +5% of the current market close price (given above). Any order placed with price beyond these limits should be rejected.
2. **Tick Size:** This refers to the minimum price movement of a trading instrument in a market. The tick sizes for our currency pairs are as follows: USDINR = 0.025, USDCNH = 0.0001, EURUSD = 0.00001, USDJPY = 0.01, USDGBP = 0.00001.

Watchlist Section

In this section, we need to update the price for each currency pair every second by some x ticks, where x is the number of ticks to add to the close price. The updated price should be calculated as close price + ($\pm x * \text{tick size}$). Additionally, we need to display the corresponding change in price with respect to the close price.

Currency Pair: USDINR

- Close Price: 82.5500
- Update: Close price + ($\pm x * \text{tick size}$)

Currency Pair: USDCNH

- Close Price: 6.88650
- Update: Close price + ($\pm x * \text{tick size}$)

Currency Pair: EURUSD

- Close Price: 1.06641
- Update: Close price + ($\pm x * \text{tick size}$)

Orders and Postions section

There are three tabs in this assessment: one each for Parent orders, Child orders, and Positions.

Possible order states are as follows:

1. Open
2. Partial Fill
3. Complete Fill
4. Canceled
5. Rejected

Every order in the system has a unique order ID, and Canceled/Rejected/Complete Fill are the final states of an order.

Parent Orders:

The following are the orders that we can place from the watchlist:

The user can choose whichever currency pair they want to trade. When hovering on any currency pair, an "Add" button will appear. On clicking this button, an order entry form will open, which contains fields such as price, quantity, side, and an "Add order" button. Upon clicking the "Add order" button, the entry will be added to the Parent Order section.

In the Parent Order section, each order has three available options: execute, cancel, and show child orders corresponding to the parent order. If the execute button is clicked, an order entry window will appear, allowing the end-user to provide the price and quantity of a parent order to be executed. Executing an order means trading that order instantly.

Clicking on the show child orders button will display all executed orders for that parent ID in a separate section called ChildOrders.

Finally, clicking on the cancel button will cancel the order if the order is still open.

Parent order columns:

| Column Name | Description |
|--------------------|--|
| OrderId | Unique ID for the client order |
| Symbol | Currency pair symbol |
| Price | Price at which the order was placed |
| Quantity | Quantity of the currency pair in the order |
| Traded Quantity | Cummulative traded quantity |
| Side | Whether it is a buy or sell order |

| | |
|--------------|--|
| Order status | Current status of the order (Open, Partial Fill, Complete Fill, Canceled, Rejected) |
| SpreadCost | The difference in the cumulative traded price of child orders and parent order price |

Child Orders:

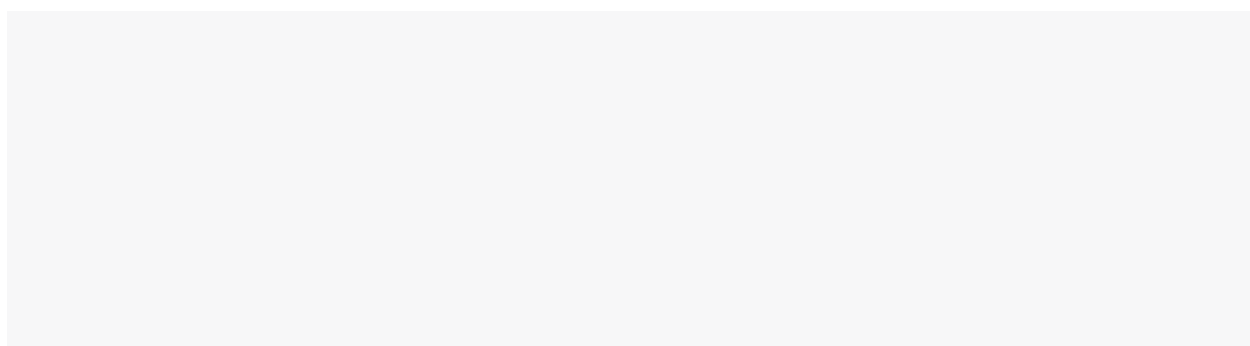
A child order refers to a partial execution of a parent order, wherein the total quantity of the parent order is split into smaller orders. A single parent order can have a minimum of 1 to a maximum of 10,000 child orders. It's worth noting, however, that the sum of all child orders must always be equal to the quantity of the parent order that was traded.

In the parent order section, every order will have actions which contains three options: execute, cancel, and show child orders. On every successful execution, we need to add the entry in the child order section for that corresponding parent order. On show child orders, we need to switch the tab from parent orders to child orders and show all the corresponding executed child orders for that parent order id.

Child order columns:

| Column Name | Description |
|-------------|--|
| OrderId | Unique ID for the child order, which is linked to a parent order |

| | |
|---------------|--|
| ParentOrderId | Unique ID for the parent order to which the child order is linked |
| Symbol | Currency pair symbol |
| Price | Price at which the order was placed for the child order |
| Quantity | Quantity of the currency pair in the child order. Remember this should never exceed parent order quantity. |
| Side | Whether it is a buy or sell order (bid or ask) for the child order |
| Order status | Current status of the child order (Open, Partial Fill, Complete Fill, Canceled, Rejected) |



Positions:

A position is a cumulative quantity of the currency pair.

Moving onto the position section, we will show all the currency pairs, their corresponding net quantity (which can be negative if we sold more than bought), and the average traded price.

Position columns as follows:

| Column Name | Description |
|---------------|---|
| Symbol | Currency pair symbol |
| Net quantity | The total quantity of the currency pair held |
| Average price | The average price of the currency pair holdings |

To ensure proper handling of orders, certain validations should be taken into account, such as price and order details. It is also important to consider the handling of final states when placing an order. Additionally, following code quality rules is crucial. If the candidate also incorporates better UI/UX, it would be considered an added bonus.

Including a readme file in your code would be mandatory, as it would assist us in navigating through it. Additionally, if you could share how you managed order management, as well as any other important logic that you think is relevant, it would be helpful.

Design

Watchlist + Parent Orders view

| FX Trading | | | | | | | |
|------------|------------------------|---------------|--------|--------------|----------|-----------|--------------|
| Watchlist | | Parent orders | | Child orders | | Positions | |
| USDINR | 83.42 0.15 (+0.00%) | Order ID | Symbol | Price | Quantity | Side | Order status |
| | | BX10001 | USDINR | 83.40 | 0/100 | BUY | Open |
| USDCNH | 83.42 0.15 (+0.00%) | BX10002 | USDINR | 83.40 | 50/200 | SELL | Partial |
| | | BX10003 | USDCNH | 144.30 | 0/50 | BUY | Open |
| USDJPY | 83.42 0.15 (+0.00%) | BX10004 | EURUSD | 32.50 | 0/60 | BUY | Open |
| | | BX10005 | USDJPY | 200.10 | 0/200 | BUY | Cancelled |
| EURUSD | 83.42 0.15 (+0.00%) | BX10006 | USDINR | 83.40 | 0/5400 | BUY | Open |
| | | BX10007 | USDGBP | 78.90 | 0/310 | BUY | Cancelled |
| USDGBP | Add order | BX10008 | USDINR | 83.40 | 0/11 | BUY | Cancelled |
| | | BX10009 | USDINR | 83.40 | 0/45 | BUY | Open |
| USDINR | 83.42 0.15 (+0.00%) | | | | | | |
| USDINR | 83.42 0.15 (+0.00%) | | | | | | |
| USDINR | 83.42 0.15 (+0.00%) | | | | | | |

☒ Execute order
 ☒ Show child orders
 ☒ Cancel order

Add Order

FX Trading

Balu

| Watchlist | | Parent orders | | Child orders | | Positions | | |
|-----------|------------------------|---------------|--------|--------------|----------|-----------|--------------|---|
| | | Order ID | Symbol | Price | Quantity | Side | Order status | |
| USDINR | 83.42 0.15 (+0.00%) | BX10001 | USDINR | 83.40 | 0/100 | BUY | Open | ⋮ |
| USDCNH | 83.42 0.15 (+0.00%) | BX10002 | | | 50/200 | SELL | Partial | ⋮ |
| | | BX10003 | | | 0/50 | BUY | Open | ⋮ |
| USDJPY | 83.42 0.15 (+0.00%) | BX10004 | | | 0/60 | BUY | Open | ⋮ |
| | | BX10005 | | | 0/200 | BUY | Cancelled | ⋮ |
| EURUSD | 83.42 0.15 (+0.00%) | BX10006 | | | 0/5400 | BUY | Open | ⋮ |
| USDGBP | 83.42 0.15 (+0.00%) | BX10007 | | | 0/310 | BUY | Cancelled | ⋮ |
| | | BX10008 | | | 0/11 | BUY | Cancelled | ⋮ |
| USDINR | 83.42 0.15 (+0.00%) | BX10009 | | | 0/45 | BUY | Open | ⋮ |
| USDINR | 83.42 0.15 (+0.00%) | | | | | | | |
| USDINR | 83.42 0.15 (+0.00%) | | | | | | | |
| | | | | | | | | |

Add order

Order IDBX10001

USDINR83.42
0.15 (+0.00%)

BUYSELL


Price

Quantity

AddCancel

Execute Order

FX Trading

 Balu

| Watchlist | | Parent orders | | Child orders | | Positions | |
|-----------|-----------------------|---------------|--------|--------------|----------|-----------|--------------|
| | | Order ID | Symbol | Price | Quantity | Side | Order status |
| USDINR | 83.42 0.15 (+0.0%) | BX10001 | USDINR | 83.40 | 0/100 | BUY | Open |
| USDCNH | 83.42 0.15 (+0.0%) | BX10002 | | | 50/200 | SELL | Partial |
| | | BX10003 | | | 0/50 | BUY | Open |
| USDJPY | 83.42 0.15 (+0.0%) | BX10004 | | | 0/60 | BUY | Open |
| | | BX10005 | | | 0/200 | BUY | Cancelled |
| EURUSD | 83.42 0.15 (+0.0%) | BX10006 | | | 0/5400 | BUY | Open |
| | | BX10007 | | | 0/310 | BUY | Cancelled |
| USDGBP | 83.42 0.15 (+0.0%) | BX10008 | | | 0/11 | BUY | Cancelled |
| | | BX10009 | | | 0/45 | BUY | Open |
| USDINR | 83.42 0.15 (+0.0%) | | | | | | |
| USDINR | 83.42 0.15 (+0.0%) | | | | | | |

Execute order

Order ID BX10001

USDINR 83.42
0.15 (+0.0%)

BUY ☒ SELL ☐

Price

Quantity

Submit Cancel

Cancel Order

FX Trading

Balu

| Watchlist | | Parent orders | | Child orders | | Positions | |
|-----------|------------------------|---------------|--------|--------------|----------|-----------|--------------|
| | | Order ID | Symbol | Price | Quantity | Side | Order status |
| USDINR | 83.42 0.15 (+0.00%) | BX10001 | USDINR | 83.40 | 0/100 | BUY | Open |
| USDCNH | 83.42 0.15 (+0.00%) | BX10002 | | | 50/200 | SELL | Partial |
| | | BX10003 | | | 0/50 | BUY | Open |
| USDJPY | 83.42 0.15 (+0.00%) | BX10004 | | | 0/60 | BUY | Open |
| | | BX10005 | | | 0/200 | BUY | Cancelled |
| EURUSD | 83.42 0.15 (+0.00%) | BX10006 | | | 0/5400 | BUY | Open |
| | | BX10007 | | | 0/310 | BUY | Cancelled |
| USDGBP | 83.42 0.15 (+0.00%) | BX10008 | | | 0/11 | BUY | Cancelled |
| | | BX10009 | | | 0/45 | BUY | Open |
| USDINR | 83.42 0.15 (+0.00%) | | | | | | |
| USDINR | 83.42 0.15 (+0.00%) | | | | | | |
| USDINR | 83.42 0.15 (+0.00%) | | | | | | |

Cancel order

Order IDBX10001

SymbolUSDINR

Price83.42

SideSELL

Filled Quantity50

Quantity100

Cancel

Cancel

Child orders view

The child orders view will be exactly similar to the Parent orders view. You can change the columns of the table from the list given above in the child orders section. However, this is a view-only table, and there are no user actions in the child orders table.

Positions view

The positions view will be exactly similar to the Parent orders view. You can change the columns of the table from the list given above in the positions section. However, this is a view-only table, and there are no user actions in the positions table.