OMS-ECN Protocol

I developed the OMS-ECN "protocol" to transmit the order information necessary to route orders between the OMS and an ECN. The Offer object is a subset of order information which is used in conjunction with order_info objects as a rudimentary communication framework between the OMS and each ECN.

The OMS – ECN Protocol is primarily comprised of the *Offer* and *order_info* objects.

Offers contain the order data required to be processed by an ECN. Order_info objects are generated by an ECN whenever an order is used in a transaction.

Demonstration of Order_info

CODE:

```
int main(){

   ifstream read_data("/Users/thomasciha/Documents/2nd Year/CS 275/IBM_Trades_N_Quotes.csv"); // note: there are 1353590 lines

   string line;
   getline(read_data,line); //get header, throw it out
   class ECN Test_ECN("ECN1");
   // creating sample order to test system:

   hours hrs (stoi("9"));
   minutes mns (stoi("45"));
   milliseconds ms = duration_cast<milliseconds> (hrs) + duration_cast<milliseconds>(mns);
   cout << " ms = " << ms.count() << endl;

   Order sample_buy(1,2, 700, Stock, "IBM", ms, Market, Day, Buy, 0);
   Order sample_ask(2,3, 500, Stock, "IBM", milliseconds(500), Market, Day, Sell, 0);

   vector<class ECN *> OMS_Initializer;
   OMS_Initializer.push_back(&Test_ECN);
   OMS my_broker(OMS_Initializer);

   int count = 0;

   while(getline(read_data, line)){
      Offer temp = create_offer(line);
      if(count > 200000 && count < 200015)
         Test_ECN.ParseOffer(temp);
      count +=1;
   }

   cout << "CURRENT BIDS: " << endl;
   my_broker.available_ECNs[0]->market.Print_Offers(Bid);
   cout << "CURRENT ASKS: " << endl;
   my_broker.available_ECNs[0]->market.Print_Offers(Ask);
```

Restricts number of offers to 15

```
    order_info of = my_broker.ProcessOrder(sample_buy);
    of.Print();

    cout << "CURRENT BIDS: AFTER TRADE" << endl;
    my_broker.available_ECNs[0]->market.Print_Offers(Bid);
    cout << "CURRENT ASKS: AFTER TRADE" << endl;
    my_broker.available_ECNs[0]->market.Print_Offers(Ask);

    read_data.close();
}
```

OUTPUT:

CURRENT BIDS:

| 153.84 100 37672788|

| 153.84 100 37672788|

| 153.84 100 37672788|

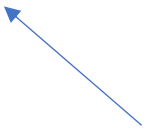
| 153.84 100 37672788|

| 153.84 100 37672788|

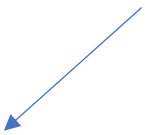
| 153.81 200 37672789|

| 153.59 100 37672790|

Note: the format of the offers is [price, qty, timestamp]



Offers 200,000 – 200,015



CURRENT ASKS:

| 153.86 200 37672788|

| 153.86 200 37672788|

| 153.87 100 37672788|

| 153.87 100 37672788|

| 153.87 100 37672788|

| 153.88 100 37672789|

| 153.9 100 37672788|

Avg Price: 153.864
Shares Filled: 700
Order Status: Filled

Order_info returned from ECN illustrates the market order was completely filled at an average price of 153.86 and that 700 shares were filled at this ECN.

CURRENT BIDS: AFTER TRADE

| 153.84 100 37672788|

| 153.84 100 37672788|

| 153.84 100 37672788|

| 153.84 100 37672788|

| 153.84 100 37672788|

| 153.81 200 37672789|

| 153.59 100 37672790|

The OMS just processed a market order with a quantity of 700 shares. These are the remaining bids and asks.

CURRENT ASKS: AFTER TRADE

| 153.88 100 37672789|

```
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| 153.9   100     37672788|
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Program ended with exit code: 0
```