# aardvark

0.4.0

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# Chapter 1

# Options-algo

This program demonestrates how to optimize option contracts porfolio according to the average of amount expiring option contracts expiring from a data set given by the developer.

## 1.1 Why

The finance industry is growing in tremendous speed by using technology. Project like this play fundamental roles in quantitative finance firms.

## 1.2 How to use

1. The program source code can be found at ( https://github.com/addisgithub/Options-Algo.git) or ()
2. After cloning the templete, you can run the pprogram from the main file in src.

### 1.2.1 Instructions & Examples

Although the data is given by the developer you can edit the file as needed. The two maps used to show the data are portfolio & values both can be altered and are found in the constuctor of the class.

## 1.3 Data structures & Agorithms

1. Maps are used frequently in this program because of their key value paring structure. They are used to match between differnt data sets using their keys.
2. Vectors are used in this program for storage of strings(tickers).
3. The algorithm calculates the average amount of expiring contracts in accordance to our porfolio and optimizes our porfolio to maintain eual or below market average.

4. Since this data was made by the developer it was easier to traverse through using loops but if it was a larger data set pulled by an API of actual stock market option chain data set then we can use a graph structure and traverse through it using bfs or dfs.

## 1.4 References

1. https://www.geeksforgeeks.org/
2. https://www.cplusplus.com/reference/algorithm/find/
3. https://stackoverflow.com/

# Chapter 2

# Class Index

## 2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

# Chapter 3

# File Index

## 3.1 File List

Here is a list of all files with brief descriptions:

# Chapter 4

# Class Documentation

## 4.1 options Class Reference

### Public Member Functions

- options ()
- map< string, int > checker ()
- int total ()
- int average ()
- void stockprint ()
- void user (string ticker)

### Public Attributes

- vector< string > check
- map< string, int > Porfolio
- map< string, int > values
- map< string, int > stock

### 4.1.1 Detailed Description

Definition at line 17 of file main.cpp.

### 4.1.2 Constructor & Destructor Documentation

#### 4.1.2.1 options()

```
options::options ( )  [inline]
```

Definition at line 25 of file main.cpp.

```
25             {
26
27         // Porfolio Data
28
29         Porfolio["APPL"] = 999997;
30         Porfolio["MSFT"] = 5230000;
31         Porfolio["BKB.A"] = 20000;
32         Porfolio["AMZN"] = 53000;
33         Porfolio["NVDA"] = 335000;
34
35
36
37         // Values Data
38
39         values["APPL"] = 300000;
40         values["TSLA"] = 500000;
41         values["MSFT"] =  458900;
42         values["AMD"] = 234000;
43         values["COIN"] = 543200;
44         values["GOOGL"] = 980889;
45         values["FB"] = 234312;
46         values["NVDA"] = 2884003;
47         values["SPY"] = 2000;
48         values["P"] = 5432090;
49         values["BKB.A"] = 9809;
50         values["BKB.B"] = 234312;
51         values["G"] = 213131;
52         values["AMZN"] = 2300;
53         values["ALP"] = 54300;
54         values["N"] = 9808;
55         values["BK"] = 23492;
56         values["B"] = 21312;
57
58     }
```

### 4.1.3 Member Function Documentation

#### 4.1.3.1 average()

```
int options::average ( )  [inline]
```

Definition at line 92 of file main.cpp.

```
92             {
93     int average;
94     int amount = total();
95     average = amount/stock.size();
96
97     return average;
98 }
```

#### 4.1.3.2 checker()

```
map<string, int> options::checker ( )  [inline]
```

Definition at line 60 of file main.cpp.

```
60                          {
61     int val;
62     string key;
63     map<string, int>::iterator j;
64
65     for(j=Porfolio.begin(); j != Porfolio.end();j++){
66         key = j->first;
67         if(values.find(key) != values.end()){
68                 //Add it to the stock map both the key and value
69                 val = values[key];
70                 stock[key] = val;
71         }
72     }
73     return stock;
74 }
```

#### 4.1.3.3 stockprint()

```
void options::stockprint ( )  [inline]
```

Definition at line 100 of file main.cpp.

```
100                  {
101     map<string, int>::iterator k;
102     map<string, int>::iterator i;
103     int count = 0;
104     int avg = average();
105
106     cout « "List of stocks in porfolio and amount of contracts held" « endl;
107
108     for(i = Porfolio.begin(); i != Porfolio.end();i++){
109         cout « ++count « "." «" " « i->first « " " « "=" « " " « Porfolio[i->first] « "." « endl;
110     }
111
112     cout « "List of stocks to expire and amount of contracts" « endl;
113
114     count = 0;
115     for(k = stock.begin(); k != stock.end();k++){
116         cout « ++count « "." «" " « k->first « " " « "=" « " " « stock[k->first] « "." « endl;
117     }
118
119     cout « "The following stocks in your porfolio have higher amount of contracts than the average
    amount of contracts to expire" « endl;
120
121     count = 0;
122     for(k = Porfolio.begin(); k != Porfolio.end();k++){
123         if(avg < Porfolio[k->first]){
124             cout «  ++count « ". " « k->first «endl;
125             check.push_back(k->first);
126
127         }
128     }
129
130     cout « "Enter the ticker of which stock you want to sell: " « endl;
131
132
133 }
```

#### 4.1.3.4 total()

```
int options::total ( )  [inline]
```

Definition at line 76 of file main.cpp.

```
76           {
77     map<string, int> data; //map assigned for the returned value of checker function
78     map<string, int>::iterator i;
79     int count = 1;
80     data = checker();
81     int total = 0;
82 
83     //calculating total contracts to be expired.
84     for(i = stock.begin(); i != stock.end();i++){
85         total += data[i->first];
86     }
87 
88     return total;
89 
90 }
```

#### 4.1.3.5 user()

```
void options::user (
             string ticker )  [inline]
```

Definition at line 137 of file main.cpp.

```
137                         {
138 
139     map<string, int>::iterator k;
140     int sell;
141     int count = 1;
142     int avg = average();
143     int left;
144 
145     //checking for input errors
146     for(int i = 0; i<check.size(); i++){
147         if(!Porfolio[ticker]){
148             cout « "Invalid value" « endl;
149             break;
150         }else{
151             cout « "calculating the average differences... " « endl;
152 
153             //calculating differences between the average contracts to be expired and currently owned
      contracts of each stock in porfolio.
154             for(k = Porfolio.begin(); k != Porfolio.end();k++){
155                 if(avg < Porfolio[ticker]){
156                     sell = Porfolio[ticker] - avg;
157                     left = Porfolio[ticker] - sell;
158                     cout « count++ « ". " « sell « " amount of " « ticker « " has been sold." « endl;
159                     cout « "You have " « left « " contracts left of stock " « ticker « endl;
160                     break;
161                 }
162             }
163         break;
164         }
165     }
166 }
```

### 4.1.4 Member Data Documentation

#### 4.1.4.1 check

```
vector<string> options::check
```

Definition at line 19 of file main.cpp.

#### 4.1.4.2 Porfolio

```
map<string, int> options::Porfolio
```

Definition at line 20 of file main.cpp.

#### 4.1.4.3 stock

```
map<string, int> options::stock
```

Definition at line 22 of file main.cpp.

#### 4.1.4.4 values

```
map<string, int> options::values
```

Definition at line 21 of file main.cpp.

The documentation for this class was generated from the following file:

- /home/bona/CPTR227/stock-/src/main.cpp

# Chapter 5

# File Documentation

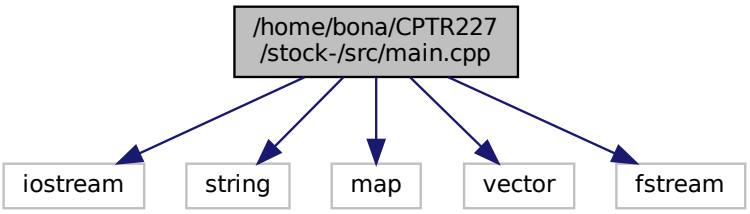
## 5.1 /home/bona/CPTR227/stock-/README.md File Reference

## 5.2 /home/bona/CPTR227/stock-/src/main.cpp File Reference

This is a programs that checks amount of options to be expired and optimizes the poroflio by average amount of contracts to expire.

```
#include <iostream>
#include <string>
#include <map>
#include <vector>
#include <fstream>
```

Include dependency graph for main.cpp:




### Classes

- class options

### Functions

- int main (int, char **)

### 5.2.1 Detailed Description

This is a programs that checks amount of options to be expired and optimizes the poroflio by average amount of contracts to expire.

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**Date**

04/21/2021

### 5.2.2 Function Documentation

#### 5.2.2.1 main()

```
int main (
              int ,
              char **  )
```

Definition at line 172 of file main.cpp.

```
172                     {
173     string input;
174
175     options test;
176     test.checker();
177     test.stockprint();
178     cin » input;
179     test.user(input);
180
181 }
```

# Index