V) C++ Code Implementation

This document attempts to justify and show how the C++ code was implemented to fit the design pattern that was described in section IV)

The Director calls a Row Builder class in order to build a particular row object (In this case, Grants and Clinical Funding.) A multimap is also created in order to store Grant_rowObjects.

```
163          //Builder object
164          GrantRowBuilder Builder;
165          multimap<string, Grant_rowObject>* grantsDictionary = new multimap<string, Grant_rowObject>();
```

Figure 5-1: Lines 163-165 of Director.cpp

The Builder then uses buildRow function which then calls a series of getAttribute functions of Attribute Retriever class that returns every attribute from the Grants row.

```
168          int count = 0;
169          while (getline(fileStream, temp))
170          {
171                  //cout << temp << endl;
172                  //make new object and insert into map
173                  Grant_rowObject holder = Builder.buildRow(temp, colIndex);
174                  grantsDictionary->insert(pair<string, Grant_rowObject>(holder.name, holder));
175                  count++;
176                  //cout << temp << endl;
177          }
```

Figure 5-2: Lines 168-177 of Director.cpp

Once a row is built, it is then stored in the multimap.

```
18      string name = fetch.getAttribute(index.name_loc);
19      string domain = fetch.getAttribute(index.domain_loc);
20      string fundType = fetch.getAttribute(index.fundType_loc);
21      string stat = fetch.getAttribute(index.stat_loc);
22      string role = fetch.getAttribute(index.role_loc);
23      string title = fetch.getAttribute(index.title_loc);
24      string pInvestigator = fetch.getAttribute(index.pInvestigator_loc);
25
26      // Deal with multiple co-investigators in a cell
27      string cpInvestigator = fetch.getAttribute(index.cpInvestigator_loc);
28      fetch.grabFirstString(cpInvestigator);//TEMPORARY -returns first co-investigator
29
30      bool peerReviewed = fetch.getBoolAttribute(index.peerReviewed_loc);
31      bool indGrant = fetch.getBoolAttribute(index.indGrant_loc);
32
33      int sDate = fetch.getIntAttribute(index.sDate_loc);
34      int eDate = fetch.getIntAttribute(index.eDate_loc);
35      int totalAmount = fetch.getIntAttribute(index.totalAmount_loc);
```

Figure 5-3: buildRow function: Lines 18-35 of GrantRowBuilder.cpp