**Pseudocode**

**START** program

**CREATE** a variable named ticks that hold system time

**CREATE** a HashTable pointer named bidTable

**CREATE** Bid object named bid

**SET** bidTable to a new HashTable object

**CREATE** an integer variable named choice and **SET** as 0

**WHILE** choice is not equal to 9

**DISPLAY** menu

**INPUT** choice

**IF** choice is equal to 1

**SET** ticks is equal to current system time

**INVOKE** loadBids function sending csvPath and bidTable as arguments

**SET** ticks equal to current system time – ticks

**OUTPUT** “time: “ + ticks + “clock ticks”

**OUTPUT** “time: “ + ticks \* 1.0 / CLOCKS\_PER\_SEC + “ seconds

**ELSE IF** choice equals 2

**INVOKE** the PrintAll() function on bidTable

**ELSE IF** choice equals 3

**SET** ticks to current system time

**SET** bid equal to bidTable’s Search() function sending bidKey as the argument

**SET** ticks equal to the current system time - ticks

**IF** bid’s bidId is not empty

**INVOKE** displayBid sending bid as the argument

**ELSE**

**OUTPUT** “BidId “ + bidKey + “ not found.”

**OUTPUT** “time: “ + ticks + “clock ticks”

**OUTPUT** “time: “ + ticks \* 1.0 / CLOCKS\_PER\_SEC + “ seconds

**ELSE IF** choice equals 4

**INVOKE** the Remove() function on bidTable sending bidKey as the argument

**ELSE IF** choice equals 9

**BREAK** out to the loop

**ELSE**

**CONTINUE** the loop

**OUTPUT** “Goodbye”

**RETURN** 0

**END** program

**Reflection**

While learning more about hash functions and coding them, a lot has come to mind. Hashing allows someone to store different objects in a multidimensional array. It is done by creating a series of buckets that the list can be sorted into. To sort the objects within the list the modulo operation is very commonly used.

While coding the hash functionality I had run into some linking errors. Although this is not caused by the hash logic it became a very large inconvenience. I was unable to test my logic to see if there was anything wrong making it hard for me to finish coding in a timely manner. I tried many different techniques to resolve my issue in hopes to get everything working correctly.