```cpp
//Ben Scherer
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// Restaurant Functions
// User picks menu items, to generate a total cost.  Then tax and tip are added in.   Finally the bill is paid and change returned

//Headers to include
#include <iostream> //cout
#include <iomanip> // used to manipulate cout
#include <string> //needed for string variable
#include <math.h> //used for basic arithmatic
#include <limits> //user for numeric_limits


using namespace std;

//Functions
double getAmtTendered(string questionToAsk,  double totalBill); //Gets amount tendered and does input validation
int getInput(string questionToAsk, string errorMsg, int lowRange, int highRange); //Generic input function. Does input validation and returns int
void displayBill(double bill, double totalBill, double totalTax, double totalTip); // Displays bill using already calculated values
void displayChange(double amtTendered, double totalBill); // Calculates change and displays information about amount tendered/change due
double itemCost(int itemChoice);  //Returns cash value of menu choice
void pauseProgram(); //Pauses program
double getOrder();  //  Returns cash value of menu choice
void displayMenu(); //Displays menu choices


//Main function of program
int main() {
    //constants
    const double taxRate = 0.065; //Sales tax
    const double tipPercent = 0.2; //Percentage to tip

    //variables
    double bill; //Total value of all menu items selected
    double totalTax; //tax due
    double totalTip; //tip amount
    double totalBill; //total bill with tax and tip added
    double amtTendered = 0.0; //cach provided to pay bill


    //Calculate Bill
    bill = getOrder(); //Get input from user and calculate total
    totalTax = bill * taxRate;
    totalTip = bill * tipPercent;
    totalBill = bill + totalTax + totalTip;

    //Display Bill
```

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48      displayBill(bill,totalBill,totalTax,totalTip);
49
50      //Payment
51      amtTendered = getAmtTendered("Amount Tendered: ",  totalBill);
52      displayChange(amtTendered,totalBill);
53
54
55      pauseProgram(); //Pause program so that results can be viewed
56      return 0;
57  }
58
59  void displayBill(double bill, double totalBill, double totalTax, double totalTip) {
60      cout << "-------------------------------------------------------\n"
61          << setw(30) << "Final Bill " << endl
62          << "-------------------------------------------------------\n"
63          << setw(30) << "Bill: $" << setprecision(2) << fixed << bill << endl
64          << setw(30) << "Tax: $" << setprecision(2) << totalTax  << endl
65          << setw(30) << "Tip: $" << setprecision(2) << totalTip  << endl
66          << setw(30) << "Total Bill: $" << setprecision(2) << totalBill  << endl
67          ;
68
69  }
70
71
72
73  void displayChange(double amtTendered, double totalBill) {
74      double changeDue = amtTendered - totalBill;
75      cout << setw(30) << "Amount Tendered: $" << setprecision(2) << amtTendered << endl
76          << setw(30) << "Change Due: $" << setprecision(2) << changeDue << endl
77          ;
78
79
80  }
81  double getOrder() { //returns total before tax/tip
82      int menuChoice;
83      double bill = 0.00;
84      displayMenu();
85      do {
86          menuChoice = getInput("Enter Menu Item: ", "ERROR: Enter a choice between 1-8", 1, 8);
87          bill += itemCost(menuChoice);
88      } while (menuChoice < 8);
89      return bill;
90  }
91
92  double itemCost(int itemChoice) { //Returns cash value of menu choice
93      switch (itemChoice) {
94          case 1: return 7.00;
95          case 2: return 3.00;
96          case 3: return 1.75;
```

```
 97          case 4: return 3.25;
 98          case 5: return 1.50;
 99          case 6: return 4.25;
100          case 7: return 1.00;
101          default: return 0.00;
102      }
103
104  }
105
106  //Simple funciton.  Pauses program execution and waits for input
107  void pauseProgram() {
108      //pauses program
109      cout << "Press enter key to exit program\n";
110      cin.ignore(numeric_limits<streamsize>::max(), '\n');
111      cin.get();
112  }
113
114
115  void displayMenu() { //Displays food menu
116      cout << "Generic Ballpark Snack Shack Gourmet Menu\n"
117          <<  "1 - Beer " << "$7.00\n"
118          << "2 - Soda " << "$3.00\n"
119          <<  "3 - Chips " << "$1.75\n"
120          << "4 - Pizza " << "$3.25\n"
121          <<  "5 - Hotdog " << "$1.50\n"
122          << "6 - Cheesburger " << "$4.25\n"
123          <<  "7 - Water " << "$1.00\n"
124          <<  "8 - End Order\n "
125          ;
126  }
127
128
129  //simple input validation.  returns double
130  double getAmtTendered(string questionToAsk, double totalBill) {
131      double amtTendered;
132      cout << questionToAsk;
133      while (!(cin >> amtTendered) || amtTendered < totalBill) {
134          if (cin.fail())
135              cout << "Enter a valid dollar amount\n";
136          else if (amtTendered < totalBill)
137              cout << "Amount paid is lower than total bill.  Please enter a new
                amount\n";
138          cin.clear();
139          cin.ignore(numeric_limits<streamsize>::max(), '\n');
140      }
141      return amtTendered;
142  }
143
144  //Validates input based on a range.  returns int
145  int getInput(string questionToAsk, string errorMsg, int lowRange, int highRange)
       {
146      int usrInput;
```

```
147     cout << questionToAsk;
148     while (!(cin >> usrInput) || usrInput < lowRange || usrInput > highRange)
          { //Loop until integer in the specified range is entered
149         cout << errorMsg << endl;
150         cin.clear();
151         cin.ignore(numeric_limits<streamsize>::max(), '\n');
152     }
153     return usrInput;
154 }
```