```c
/*  GENERAL INFORMATION

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* Implemented:
* 1. Load the data structures required to represent
*    the stations and the trips.
* 2. Read parameters of main and 2 files required
*    to make the program work.
* 3. Build 2 menus and data input.
* 4. Build the lists of trips and stations,
*    inserting items in an ordered way.
* 5. Implementation of trips list mode.
* 6. Implementation of data filters.
* 7. Implementation of stations list mode.
* 8. Implementation of routes list mode.
*
* Not Implemented:
* 9. Implementation of graphic mode.
* 10. Implementation of statistical analysis.
* 11. Improvements of application graphics mode,
*     with a real map.
 */

#include <stdio.h>
#include <stdlib.h>
#include <time.h>
#include <stdbool.h>
#include <string.h>
#include "dataManager.h"
#include "print.h"

// EVIL GLOBAL VARIABLES
int filter_hour_start = -1;
int filter_hour_end = -1;

char trips_file[MAX_SIZE];
char stations_file[MAX_SIZE];

// DECLARATION OF FUNCTIONS

// command line interface
void mainMenu(Trip*, Station*);
void listOfStationsMenu(Trip *, Station *);
void selectDataMenu();
void selectStationMenu(Station*, Trip*, int);
void statsMenu();
void clearInputBuffer();

/* Main Function
 * \param mode and file (trips file  and stations file)
 */
int main (int argc, char *argv[]){

    // check for correct input
    if (argc != 4) {
        printf("Error - required arguments missing.\n");
        printf("Please start with -t trips-filename stations-filename\n");
        return 0;
    }
    if (strcmp(argv[1], "-t") != 0) {
        printf("Sorry - only text mode is available,");
        printf("Please start with -t\n");
        return 0;
    }

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 67      strcpy(trips_file, argv[2]);
 68      strcpy(stations_file, argv[3]);
 69
 70      Trip * allTrips = readTripsData(trips_file);
 71      Station * allStations = readStationData(stations_file);
 72
 73      mainMenu(allTrips, allStations);
 74
 75      return 0;
 76  }
 77
 78  /* Command Line Interface */
 79
 80  /* mainMenu: prints the main menu and handles the main menu options
 81   * \param tripList      the header of the trip list
 82   *                      (can be the filtered list)
 83   * \param stationsList  the header of the stations list
 84   */
 85  void mainMenu(Trip * tripsList, Station * stationsList){
 86      int command;
 87      printf("\n * M A I N   M E N U * \n\n");
 88      printf("  [ 1 ]   Select the data\n\n");
 89      printf("  [ 2 ]   Print List of trips\n\n");
 90      printf("  [ 3 ]   Print List of stations\n\n");
 91      printf("  [ 4 ]   Print List of routes\n\n");
 92      printf("  [ 5 ]   Print List of statistics\n\n");
 93      printf("  [ 6 ]   Quit\n\n");
 94      scanf("%d", &command);
 95      clearInputBuffer();
 96      switch (command) {
 97          case 1:
 98              selectDataMenu(tripsList, stationsList);
 99              break;
100          case 2:
101              command = -1;
102              while ((command < 0) || (command > 32000)) {
103                   printf("How many trips do you want to print?");
104                   printf("0..32000, enter 0 for all)\n");
105                   scanf("%d", &command);
106                   clearInputBuffer();
107              }
108              printTripsList(tripsList, command);
109              mainMenu(tripsList, stationsList);
110              break;
111          case 3:
112              listOfStationsMenu(tripsList, stationsList);
113              break;
114          case 4:
115              selectStationMenu(stationsList, tripsList, 0);
116              break;
117          case 5:
118              statsMenu();
119              mainMenu(tripsList, stationsList);
120              break;
121          case 6:
122              exit(EXIT_SUCCESS);
123              break;
124          default:
125              printf("Error: invalid command...\n");
126              mainMenu(tripsList, stationsList);
127              break;
128      }
129  }
130
131  /* List of Stations Menu:   creates and prints the list of
132   *                          stations with max/min/avg
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133   * \param tripList          the header of the trip list
134   *                          (usually the filtered list)
135   * \param stationsList      the header of the stations list
136   */
137  void listOfStationsMenu(Trip * tripsList, Station * stationsList){
138      Station * filteredStations = countBikes(tripsList,
139          stationsList, filter_hour_start, filter_hour_end);
140
141      // option to ask the user: limit (0 for all),
142      //should print stations with no trips (YES, NO)
143      printStationsList(filteredStations, 0, YES);
144      mainMenu(tripsList, stationsList);
145  }
146
147  /* SelectDataMenu: prints and manages the menu to set
148  *                  search criteria
149   * \param filteredTrips     the header of the trip list
150                              (can be the filtered list)
151   * \param allStations       the header of all stations list
152   */
153  void selectDataMenu(Trip * filteredTrips, Station * allStations){
154
155      int duration = -1, command;
156
157      printf("\n * Select the mode of your search * \n\n");
158      printf("  [ 1 ]   Period of time (hour start, hour end)\n\n");
159      printf("  [ 2 ]   Day of week\n\n");
160      printf("  [ 3 ]   Max duration of trip (in seconds)\n\n");
161      printf("  [ 4 ]   New Search (reset list)\n\n");
162      printf("  [ 5 ]   Return to Main Menu\n\n");
163      scanf("%d", &command);
164      clearInputBuffer();
165      switch (command) {
166          case 1:
167              command = -1;
168
169              while ((command < 0) || (command > 23)) {
170                  printf("Insert start time of trip (hour 0..23):\n");
171                  scanf("%d", &command);
172                  clearInputBuffer();
173              }
174              // temporary place to store start time cannot
175              //overwrite the global now
176              // because we use it to understand if user has
177              //used the filter before, later in the code
178              int start = command;
179
180              command = -1;
181              while ((command < 0) || (command > 23)) {
182                  printf("Insert end time of trip (hour 0..23):\n");
183                  scanf("%d", &command);
184                  clearInputBuffer();
185              }
186              filter_hour_end = command;
187
188              // if user had filtered the list before,
189              // reset the list to avoid problems
190              if (filter_hour_start != -1) {
191                  // now we can save the start time
192                  filter_hour_start = start;
193                  Trip * allTrips = readTripsData(trips_file);
194                  printf("Note: a time filter was already applied.\n");
195                  printf("The trip list was reset to use the new param.\n");
196                  filteredTrips = selectTripsByTime(allTrips,
197                                  filter_hour_start, filter_hour_end);
198              } else {
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199                 filter_hour_start = start;
200                 filteredTrips = selectTripsByTime(filteredTrips,
201                                 filter_hour_start, filter_hour_end);
202             }
203             mainMenu(filteredTrips, allStations);
204             break;
205         case 2:
206             command = 0;
207             while ((command < 1) || (command > 7)) {
208                 printf("\nPlease insert the day of trip:\n\n");
209                 printf("  [ 1 ]   Monday\n");
210                 printf("  [ 2 ]   Tuesday\n");
211                 printf("  [ 3 ]   Wednesday\n");
212                 printf("  [ 4 ]   Thursday\n");
213                 printf("  [ 5 ]   Friday\n");
214                 printf("  [ 6 ]   Saturday\n");
215                 printf("  [ 7 ]   Sunday\n");
216                 scanf("%d", &command);
217                 clearInputBuffer();
218             }
219             filteredTrips = selectTripsByDay(filteredTrips, command);
220             mainMenu(filteredTrips, allStations);
221             break;
222         case 3:
223             while ((duration < 0) || (duration > 32767)) {
224                 printf("Insert the max duration of trip (in seconds):\n");
225                 scanf("%d", &duration);
226                 clearInputBuffer();
227             }
228             filteredTrips = selectTripsByDuration(filteredTrips,duration);
229             mainMenu(filteredTrips, allStations);
230             break;
231         case 4:
232             filter_hour_end = -1;
233             filter_hour_start = -1;
234             Trip * allTrips = readTripsData(trips_file);
235             mainMenu(allTrips, allStations);
236             break;
237         case 5:
238             if (filteredTrips != NULL)
239                 mainMenu(filteredTrips, allStations);
240             else {
241                 Trip * allTrips = readTripsData(trips_file);
242                 mainMenu(allTrips, allStations);
243             }
244             break;
245         default:
246             printf("Error: invalid command...\n");
247             if (filteredTrips != NULL)
248                 selectDataMenu(filteredTrips, allStations);
249             else {
250                 Trip * allTrips = readTripsData(trips_file);
251                 selectDataMenu(allTrips, allStations);
252             }
253             break;
254     }
255 }
256
257 /* selectStationMenu:
258  * \param allStations      the header of all stations list
259  * \param filteredTrips    the header of the trips list (can be filtered)
260  * \param id               the ID of the station
261  */
262 void selectStationMenu(Station * allStations,Trip * filteredTrips,int id){
263     int command = -1;
264     char stationName[7] = "";
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265
266      // validate id of station
267      while (strcmp(stationName, "") == 0) {
268          printf("Insert the id of the station:\n");
269          scanf("%d", &id);
270          clearInputBuffer();
271          strcpy(stationName, getStationNameById(id, allStations));
272      }
273      filteredTrips = selectTripsByIdStation(filteredTrips, id);
274
275      command = -1;
276      while ((command <0) || (command > 32767)) {
277          printf("How many routes do yo want to print? (0 for all)\n");
278          scanf("%d", &command);
279          clearInputBuffer();
280      }
281      printRoutesList(filteredTrips, allStations, id, command);
282      Trip * allTrips = readTripsData(trips_file);
283      mainMenu(allTrips, allStations);
284  }
285
286  /* statsMenu: placeholder for the stats section
287   */
288  void statsMenu() {
289      printf("Sorry, the statistics are not yet implemented\n");
290  }
291
292  /* clearInputBuffer: handles input of multiple characters
293   * resets the input buffer to avoid double-commands
294   * Source:
295   *
stackoverflow.com/questions/3969871/using-getchar-on-c-gets-the-enter-after-input
296   */
297  void clearInputBuffer() // works only if the input buffer is not empty
298  {
299      char c;
300      do {
301          c = getchar();
302      } while (c != '\n' && c != EOF);
303      return;
304  }
```