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NIM: 2702373412

Kelas: LA01

Subject: AOL Algorithm and Programming

Code Documentation

Study Case 1:

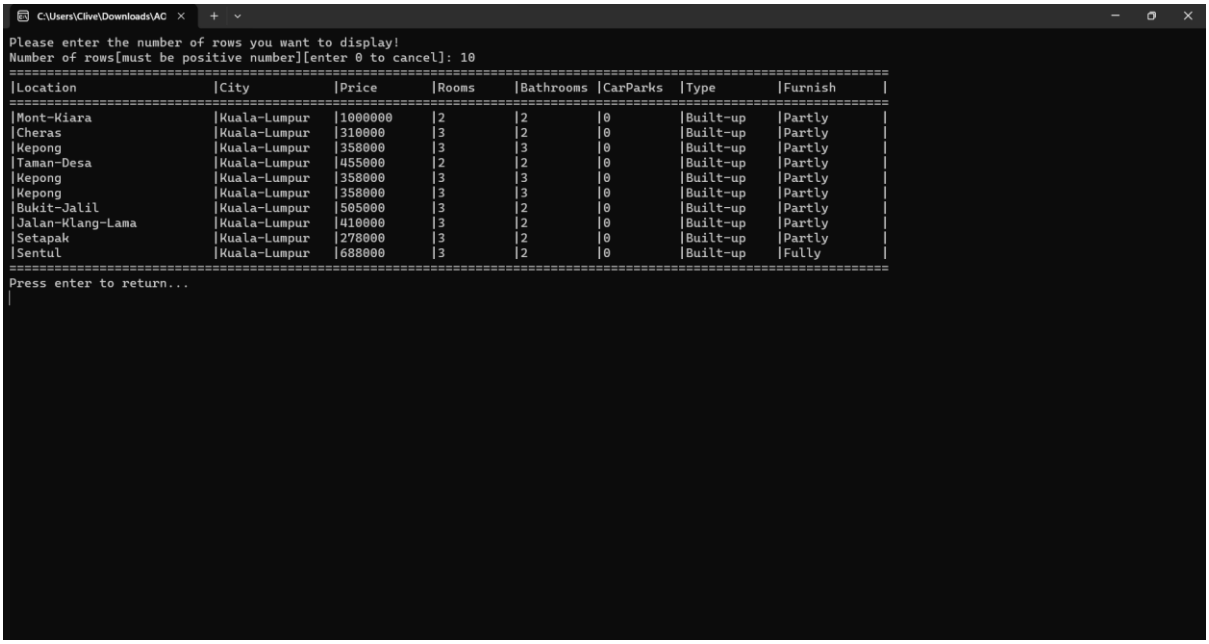
```
#include <stdio.h>
#include <string.h>
/*AOL AlgoProg - Case Study 1
	Name: Clive Clay Irawan
	NIM: 2702373412
	Class: LA01

	Goal: Make a program that takes a string then reverse it, followed
		by inverse capitalization
*/

void reverseString(char* text,int length) {
   for(int i = 0; i<length/2;i++){
	char temp = text[i];
	text[i] = text[length-i-1];
	text[length - i - 1] = temp;
	}
}

int main (){
	char S[105];
	int length;
	scanf("%[^\n]", S);getchar();
```

```
    length = strlen(S);
    reverseString(S,length);
    for(int i = 0; i<length; i++){
        if(S[i]>='A'&&S[i]<='Z'){
            S[i] = S[i]+32;
        }else if(S[i]>='a'&&S[i]<='z'){
            S[i] = S[i]-32;
        }
        printf("%c",S[i]);
    }
    printf("\n");
    return 0;
}
```

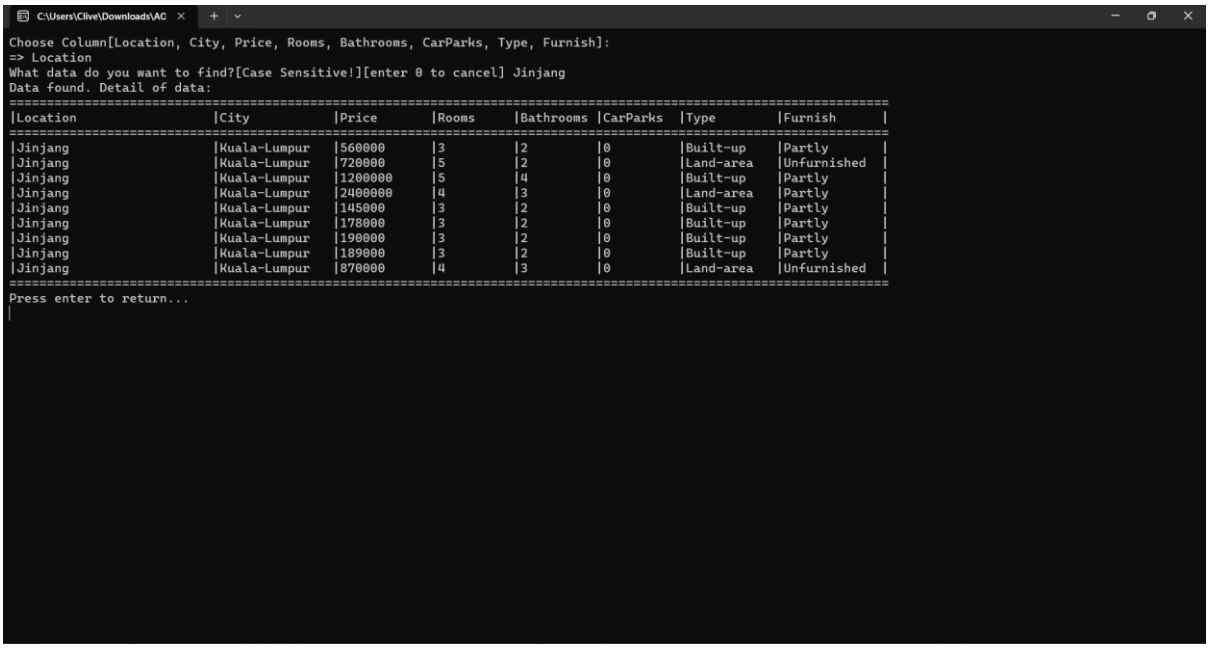
Study Case 2:

1. Main Menu:

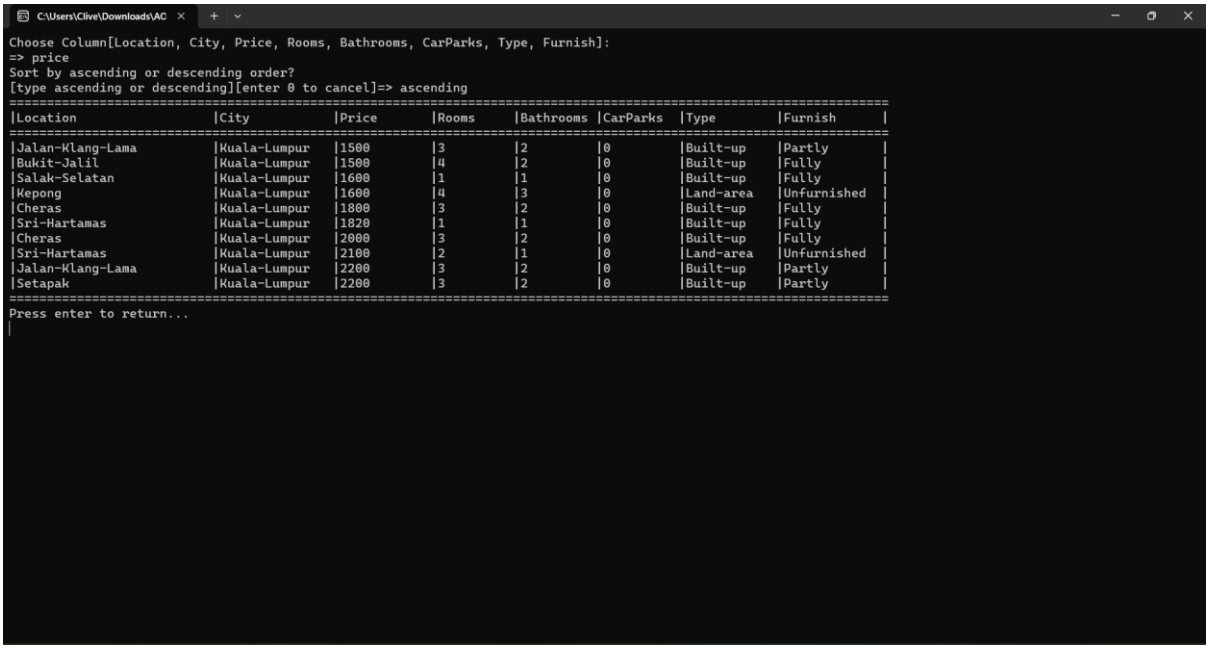
2. Menu 1



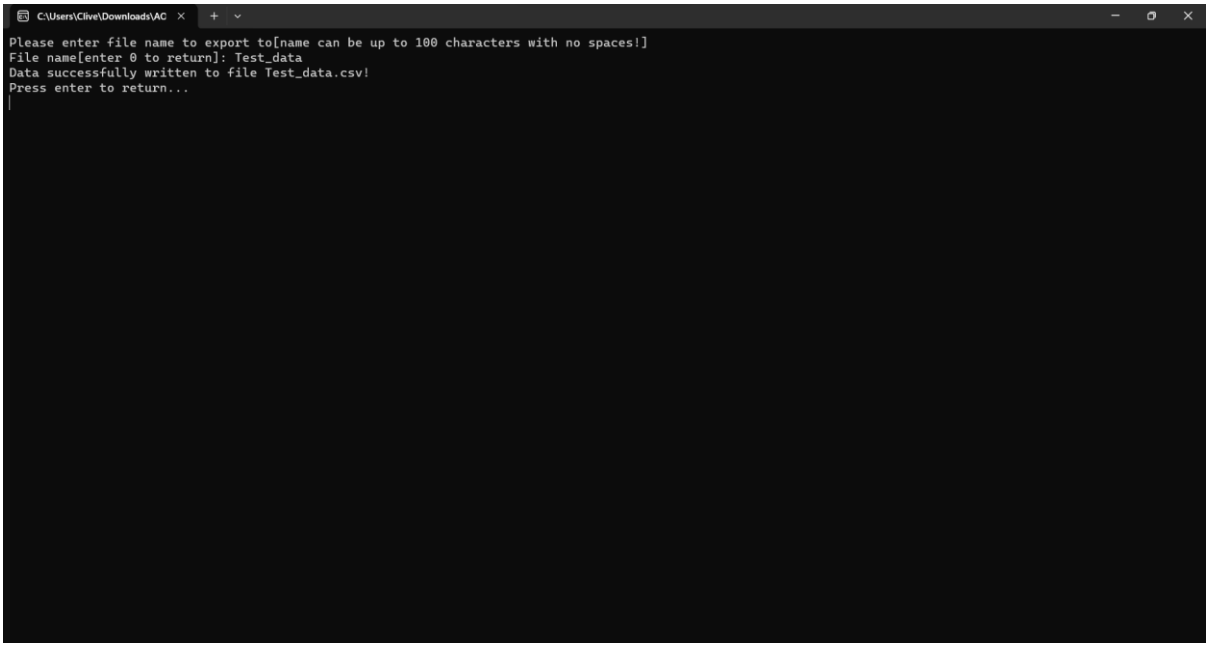
3. Menu 2



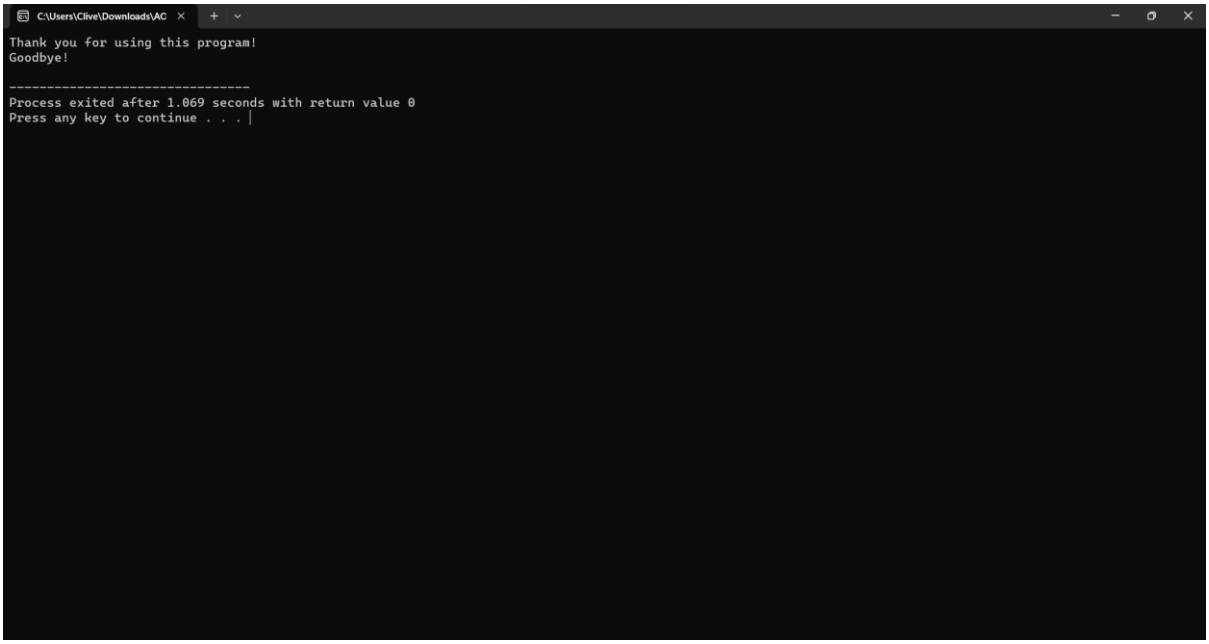
4. Menu 3



5. Menu 4



6. Menu 5




```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
/*AOL AlgoProg - Case Study 2
	Name: Clive Clay Irawan
	NIM: 2702373412
	Class: LA01

	Goal: Make a program that fulfill the requirements specified in
		the sheet.
*/
struct Data{
	char location[105];
	char city[105];
	int price;
	int rooms;
	int bathroom;
	int carPark;
	char type[25];
```

```
        char furnish[25];
}sheet[3940];


char locationRow[105],cityRow[105],priceRow[105],roomsRow[105],bathroomRow[105],carparkRow[105],typeRow[105],furnishRow[105];


void swap(Data *a, Data *b){
//Function: bagian dari quickSort yang berguna untuk menukar antar data
        Data temp = *a;
        *a = *b;
        *b = temp;
}


int partition(int low, int high,char columnChoice[],char sortChoice[]){
//Function: bagian dari quickSort yang berguna untuk membandingkan
        int pivotIdx = high;
        int i = (low-1);


        for(int j=low;j<high;j++){
                if(strcmp(columnChoice,priceRow)==0||strcmp(columnChoice,"price")==0){
                        if(strcmp(sortChoice,"descending")==0){
                                if(sheet[j].price>sheet[pivotIdx].price){
                                        i++;
                                        swap(&sheet[i],&sheet[j]);
                                }
                        }else if(strcmp(sortChoice,"ascending")==0){
                                if(sheet[j].price<sheet[pivotIdx].price){
                                        i++;
                                        swap(&sheet[i],&sheet[j]);
                                }
```

```
                }
        }else
if(strcmp(columnChoice,locationRow)==0||strcmp(columnChoice,"location")==0){
                if(strcmp(sortChoice,"ascending")==0){
                        if(strcmp(sheet[j].location,sheet[pivotIdx].location)<=0){
                                i++;
                                swap(&sheet[i],&sheet[j]);
                        }
                }else if(strcmp(sortChoice,"descending")==0){
                        if(strcmp(sheet[j].location,sheet[pivotIdx].location)>0){
                                i++;
                                swap(&sheet[i],&sheet[j]);
                        }
                }
        }else
if(strcmp(columnChoice,cityRow)==0||strcmp(columnChoice,"city")==0){
                if(strcmp(sortChoice,"ascending")==0){
                        if(strcmp(sheet[j].city,sheet[pivotIdx].city)<=0){
                                i++;
                                swap(&sheet[i],&sheet[j]);
                        }
                }else if(strcmp(sortChoice,"descending")==0){
                        if(strcmp(sheet[j].city,sheet[pivotIdx].city)>0){
                                i++;
                                swap(&sheet[i],&sheet[j]);
                        }
                }
        }else
if(strcmp(columnChoice,roomsRow)==0||strcmp(columnChoice,"rooms")==0){
                if(strcmp(sortChoice,"descending")==0){
                        if(sheet[j].rooms>sheet[pivotIdx].rooms){
```

```
                        i++;
                        swap(&sheet[i],&sheet[j]);
                    }
                }else if(strcmp(sortChoice,"ascending")==0){
                    if(sheet[j].rooms<sheet[pivotIdx].rooms){
                        i++;
                        swap(&sheet[i],&sheet[j]);
                    }
                }
            }else
if(strcmp(columnChoice,bathroomRow)==0||strcmp(columnChoice,"bathrooms")==0){
                if(strcmp(sortChoice,"descending")==0){
                    if(sheet[j].bathroom>sheet[pivotIdx].bathroom){
                        i++;
                        swap(&sheet[i],&sheet[j]);
                    }
                }else if(strcmp(sortChoice,"ascending")==0){
                    if(sheet[j].bathroom<sheet[pivotIdx].bathroom){
                        i++;
                        swap(&sheet[i],&sheet[j]);
                    }
                }
            }else
if(strcmp(columnChoice,carparkRow)==0||strcmp(columnChoice,"carparks")==0){
                if(strcmp(sortChoice,"descending")==0){
                    if(sheet[j].carPark>sheet[pivotIdx].carPark){
                        i++;
                        swap(&sheet[i],&sheet[j]);
                    }
                }else if(strcmp(sortChoice,"ascending")==0){
                    if(sheet[j].carPark<sheet[pivotIdx].carPark){
```

```
                    i++;
                    swap(&sheet[i],&sheet[j]);
                }
            }
        }else if(strcmp(columnChoice,typeRow)==0||strcmp(columnChoice,"type")==0){
            if(strcmp(sortChoice,"ascending")==0){
                if(strcmp(sheet[j].type,sheet[pivotIdx].type)<=0){
                    i++;
                    swap(&sheet[i],&sheet[j]);
                }
            }else if(strcmp(sortChoice,"descending")==0){
                if(strcmp(sheet[j].type,sheet[pivotIdx].type)>0){
                    i++;
                    swap(&sheet[i],&sheet[j]);
                }
            }
        }else if(strcmp(columnChoice,furnishRow)==0||strcmp(columnChoice,"furnish")==0){
            if(strcmp(sortChoice,"ascending")==0){
                if(strcmp(sheet[j].furnish,sheet[pivotIdx].furnish)<=0){
                    i++;
                    swap(&sheet[i],&sheet[j]);
                }
            }else if(strcmp(sortChoice,"descending")==0){
                if(strcmp(sheet[j].furnish,sheet[pivotIdx].furnish)>0){
                    i++;
                    swap(&sheet[i],&sheet[j]);
                }
            }
        }
```

```
        }
        i++;
        swap(&sheet[i],&sheet[pivotIdx]);
        return i;
}

void quickSort(int low, int high,char columnChoice[],char sortChoice[]){
        //Function: digunakan untuk mengsortir list
        if(low>=high){
                return;
        }
        int pi = partition(low,high,columnChoice,sortChoice);

        quickSort(low,pi-1,columnChoice,sortChoice);
        quickSort(pi+1,high,columnChoice,sortChoice);
}

void linearSearch(int size, char columnChoice[], char findData[],int flag){
//Function: bagian dari function 2 yang digunakan untuk membandingkan data yang dicari dengan file csv
        for(int i = 0;i<size;i++){

        if(strcmp(columnChoice,locationRow)==0||strcmp(columnChoice,"location")==0){
                        if(strcmp(sheet[i].location,findData)==0){
                                flag++;
                                if(flag==1){
                                        printf("Data found. Detail of data:\n");

        printf("==========================================================
==========================================================\n");
                                        printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-12s|%-
```

```
13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furni
shRow);

        printf("==========================================================
==========================================================\n");

                                }

                                printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-
13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,sheet[i].bathroom,sheet[i].c
arPark,sheet[i].type,sheet[i].furnish);

                        }

                }else
if(strcmp(columnChoice,cityRow)==0||strcmp(columnChoice,"city")==0){

                        if(strcmp(sheet[i].city,findData)==0){

                                flag++;

                                if(flag==1){

                                        printf("Data found. Detail of data:\n");


        printf("==========================================================
==========================================================\n");

                                        printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-
12s|%-
13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furni
shRow);


        printf("==========================================================
==========================================================\n");

                                }

                                printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-
13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,sheet[i].bathroom,sheet[i].c
arPark,sheet[i].type,sheet[i].furnish);

                        }

                }else
if(strcmp(columnChoice,priceRow)==0||strcmp(columnChoice,"price")==0){

                        if(sheet[i].price==atoi(findData)){

                                flag++;

                                if(flag==1){
```

```
                printf("Data found. Detail of data:\n");

        printf("================================================================
================================================================\n");

                printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-
12s|%-
13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furni
shRow);

        printf("================================================================
================================================================\n");

                }

                printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-
13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,sheet[i].bathroom,sheet[i].c
arPark,sheet[i].type,sheet[i].furnish);

            }

        }else
if(strcmp(columnChoice,roomsRow)==0||strcmp(columnChoice,"rooms")==0){

            if(sheet[i].rooms==atoi(findData)){

                flag++;

                if(flag==1){

                    printf("Data found. Detail of data:\n");

        printf("================================================================
================================================================\n");

                    printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-
12s|%-
13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furni
shRow);

        printf("================================================================
================================================================\n");

                }

                printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-
13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,sheet[i].bathroom,sheet[i].c
arPark,sheet[i].type,sheet[i].furnish);

            }
```

```
		}else
if(strcmp(columnChoice,bathroomRow)==0||strcmp(columnChoice,"bathrooms")==0){
			if(sheet[i].bathroom==atoi(findData)){
				flag++;
				if(flag==1){
					printf("Data found. Detail of data:\n");

	printf("=================================================================
=================================================================\n");
					printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-
12s|%-
13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furni
shRow);

	printf("=================================================================
=================================================================\n");
				}
				printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-
13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,sheet[i].bathroom,sheet[i].c
arPark,sheet[i].type,sheet[i].furnish);
			}
		}else
if(strcmp(columnChoice,carparkRow)==0||strcmp(columnChoice,"carparks")==0){
			if(sheet[i].carPark==atoi(findData)){
				flag++;
				if(flag==1){
					printf("Data found. Detail of data:\n");

	printf("=================================================================
=================================================================\n");
					printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-
12s|%-
13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furni
shRow);

	printf("=================================================================
=================================================================\n");
```

```
                }
                printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-
13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,sheet[i].bathroom,sheet[i].c
arPark,sheet[i].type,sheet[i].furnish);
            }
        }else
if(strcmp(columnChoice,typeRow)==0||strcmp(columnChoice,"type")==0){
            if(strcmp(sheet[i].type,findData)==0){
                flag++;
                if(flag==1){
                    printf("Data found. Detail of data:\n");

    printf("==========================================================
============================================================\n");
                    printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-
12s|%-
13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furni
shRow);

    printf("==========================================================
============================================================\n");
                }
                printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-
13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,sheet[i].bathroom,sheet[i].c
arPark,sheet[i].type,sheet[i].furnish);
            }
        }else
if(strcmp(columnChoice,furnishRow)==0||strcmp(columnChoice,"furnish")==0){
            if(strcmp(sheet[i].furnish,findData)==0){
                flag++;
                if(flag==1){
                    printf("Data found. Detail of data:\n");

    printf("==========================================================
============================================================\n");
```

```
                                        printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-12s|%-13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furnishRow);

        printf("================================================================================\n");
                                    }
                                    printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,sheet[i].bathroom,sheet[i].carPark,sheet[i].type,sheet[i].furnish);
                            }
                    }
        }
        if(flag==0){
                printf("Data not found!\n");
                return;
        }
        printf("================================================================================\n");
}

void readFile(int rows){
//Function: To read certain amount of data based on rows from the csv file
        FILE *fp;
        fp = fopen("file.csv","r");
        if (fp == NULL) {
      printf("File not found!");
      return;
   }

fscanf(fp,"%[^,],%[^,],%[^,],%[^,],%[^,],%[^,],%[^,],%[^\n]\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furnishRow);
   for(int i = 0; i<rows;i++){
```

```
        fscanf(fp,                "%[^,],%[^,],%d,%d,%d,%d,%[^,],%[^\n]\n",&sheet[i].location,
&sheet[i].city,&sheet[i].price,&sheet[i].rooms,&sheet[i].bathroom,&sheet[i].carPark,&sheet[
i].type,&sheet[i].furnish);
        }
        fclose(fp);
}
void readFileAll() {
//Function: To read every data from the csv file
   FILE *fp;
   fp = fopen("file.csv", "r");
   if (fp == NULL) {
      printf("File not found!");
      return;
   }

fscanf(fp,"%[^,],%[^,],%[^,],%[^,],%[^,],%[^,],%[^,],%[^\n]\n",locationRow,cityRow,priceR
ow,roomsRow,bathroomRow,carparkRow,typeRow,furnishRow);
   int i = 0;
   while (fscanf(fp, "%[^,],%[^,],%d,%d,%d,%d,%[^,],%[^\n]\n",
            &sheet[i].location, &sheet[i].city, &sheet[i].price,
            &sheet[i].rooms, &sheet[i].bathroom, &sheet[i].carPark,
            &sheet[i].type, &sheet[i].furnish) == 8) {
      i++;
   }
   fclose(fp);
}

void displayData(int rows){
//Function: To display data from the file based on the amount of rows that the user request
        printf("==========================================================
==========================================================\n");
```

```
	printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-12s|%-13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furnishRow);
	printf("================================================================================\n");
	for(int i = 0; i<rows;i++){
		printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,
		sheet[i].bathroom,sheet[i].carPark,sheet[i].type,sheet[i].furnish);
	}
	printf("================================================================================\n");
	printf("Press enter to return...\n");getchar();
}

void searchData(char columnChoice[],char findData[]){
//Function: To search data based on the selected column and the data that the user requested
	int size = 3940;
	readFileAll();
	int flag = 0;
	linearSearch(size-2,columnChoice,findData,flag);
	printf("Press enter to return...\n");getchar();
}

void sortData(char columnChoice[],char sortChoice[]){
//Function: To sort data based on the selected column and the chosen order
	readFileAll();
	int size = 3940;
	quickSort(0,size-2,columnChoice,sortChoice);
	printf("================================================================================\n");
```

```
	printf("|%-26s|%-15s|%-12s|%-10s|%-10s|%-10s|%-12s|%-13s|\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furnishRow);
	printf("================================================================================\n");
	for(int i = 0; i<10;i++){
		printf("|%-26s|%-15s|%-12d|%-10d|%-10d|%-10d|%-12s|%-13s|\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,
		sheet[i].bathroom,sheet[i].carPark,sheet[i].type,sheet[i].furnish);
	}
	printf("================================================================================\n");
	printf("Press enter to return...\n");getchar();
}

void exportData(const char *fileName){
//Function: To export data to a new csv file
	readFileAll();
	int size = 3940;
	FILE *csvFile;
	char *csvFileName;
	csvFileName = (char *)malloc(strlen(fileName));
	strcpy(csvFileName, fileName);
   strcat(csvFileName, ".csv");
   csvFile = fopen(csvFileName,"w");

	fprintf(csvFile,"%-26s, %-15s, %-10s, %-6s, %-10s, %-10s, %-10s, %-10s\n",locationRow,cityRow,priceRow,roomsRow,bathroomRow,carparkRow,typeRow,furnishRow);
	for(int i = 0; i<size-1;i++){
		fprintf(csvFile,"%-26s, %-15s, %-10d, %-6d, %-10d, %-10d, %-10s, %-10s\n",sheet[i].location,sheet[i].city,sheet[i].price,sheet[i].rooms,
		sheet[i].bathroom,sheet[i].carPark,sheet[i].type,sheet[i].furnish);
```

```
	}
	fclose(csvFile);
	free(csvFileName);
	printf("Data successfully written to file %s.csv!\n",fileName);
	printf("Press enter to return...\n");getchar();
}

int main (){
	int choice;
	do{
	printf("What do you want to do?\n");
	printf("1. Display data\n");
	printf("2. Search data\n");
	printf("3. Sort data\n");
	printf("4. Export Data\n");
	printf("5. Exit\n");
	printf("Choose a number[1-5]: ");
	scanf("%d", &choice);getchar();
	system("cls");
	switch(choice){
		case 1:
			int rows;
			printf("Please enter the number of rows you want to display!\n");
			printf("Number of rows[must be positive number][enter 0 to cancel]: ");
			scanf("%d",&rows);getchar();
			if(rows==0){
				system("cls");
				break;
			}
			readFile(rows);
```

```
            displayData(rows);
            system("cls");
            break;
        case 2:
            char columnChoice[105],findData[105];
            printf("Choose Column[Location, City, Price, Rooms, Bathrooms, CarParks, Type, Furnish]:\n");
            printf("=> ");
            scanf("%s",columnChoice);
            printf("What data do you want to find?[Case Sensitive!][enter 0 to cancel] ");
            scanf("%s",findData);getchar();
            if(strcmp(findData,"0")==0){
                system("cls");
                break;
            }
            searchData(columnChoice,findData);
            system("cls");
            break;
        case 3:
            char columnChoice1[105],sortChoice[15];
            printf("Choose Column[Location, City, Price, Rooms, Bathrooms, CarParks, Type, Furnish]:\n");
            printf("=> ");
            scanf("%s",columnChoice1);
            printf("Sort by ascending or descending order?\n");
            printf("[type ascending or descending][enter 0 to cancel]=> ");
            scanf("%s",sortChoice);getchar();
            if(strcmp(sortChoice,"0")==0){
                system("cls");
                break;
```

```
                }
                sortData(columnChoice1,sortChoice);
                system("cls");
                break;
        case 4:
                char fileName[105];
                printf("Please enter file name to export to[name can be up to 100 characters with no spaces!]\n");
                printf("File name[enter 0 to return]: ");
                scanf("%s",fileName);getchar();
                if(strcmp(fileName,"0")==0){
                        system("cls");
                        break;
                }
                exportData(fileName);
                system("cls");
                break;
        case 5:
                printf("Thank you for using this program!\n");
                printf("Goodbye!\n");
                return 0;
        }
    }while(choice>=1 && choice<=5||choice<1||choice>5);
    return 0;
}
```