Homework 3

Jiaxin Li

Exercise 1

1.1

Number of students: 340823

Number of schools: 898

Number of programs: 33

1.2

Number of choices: 3080

1.3

Number of students applying to at least one senior high schools in the same district to home: 262603

1.4

Number of students each senior high school admitted:

```
> ad_size
# A tibble: 640 × 2
   schoolcode ad_size
        <int>   <int>
 1      10101     398
 2      10102     248
 3      10103     443
 4      10104     220
 5      10105     346
 6      10106     395
 7      10107     306
 8      10108     318
 9      10109     300
10      10110     535
# … with 630 more rows
```

1.5

The lowest score to be admitted:

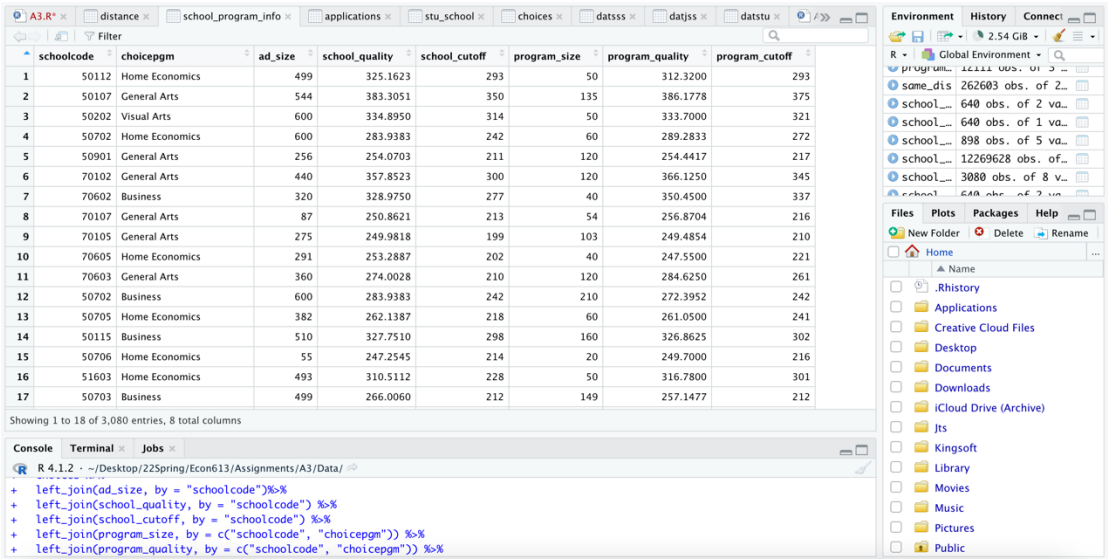
```
> school_cutoff
# A tibble: 640 × 2
   schoolcode school_cutoff
        <int>         <int>
 1      50112           293
 2      50107           350
 3      50202           314
 4      50702           242
 5      50901           211
 6      70102           300
 7      70602           277
 8      70107           213
 9      70105           199
10      70605           202
# … with 630 more rows
```

1.6

The average score of students admitted:

```
> school_quality
# A tibble: 640 × 2
   schoolcode school_quality
        <int>          <dbl>
 1      50112           325.
 2      50107           383.
 3      50202           335.
 4      50702           284.
 5      50901           254.
 6      70102           358.
 7      70602           329.
 8      70107           251.
 9      70105           250.
10      70605           253.
# … with 630 more rows
```

Exercise 2

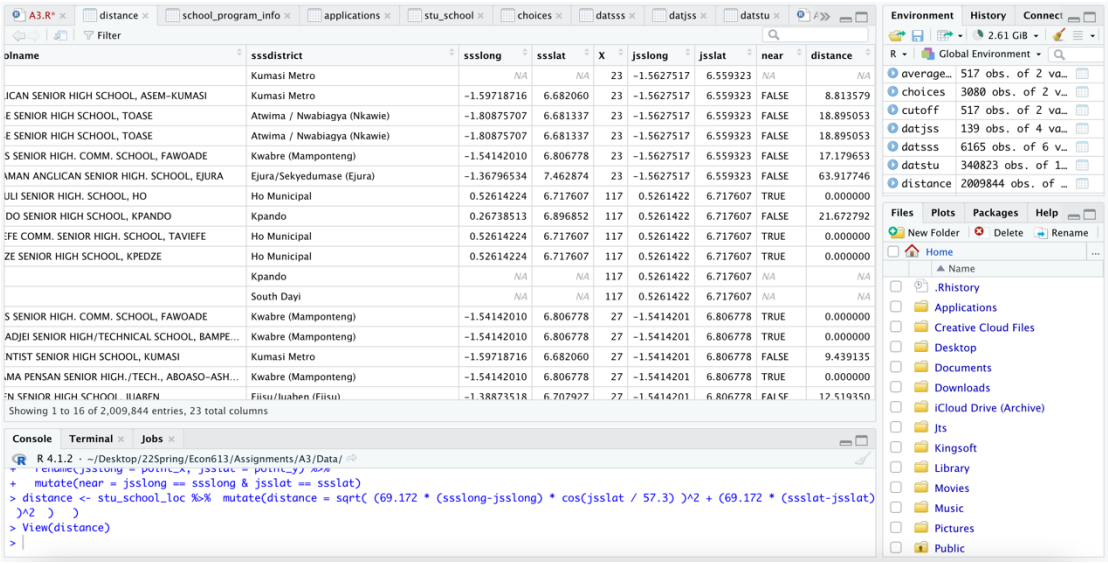


	schoolcode	choicepgm	ad_size	school_quality	school_cutoff	program_size	program_quality	program_cutoff
1	50112	Home Economics	499	325.1623	293	50	312.3200	293
2	50107	General Arts	544	383.3051	350	135	386.1778	375
3	50202	Visual Arts	600	334.8950	314	50	333.7000	321
4	50702	Home Economics	600	283.9383	242	60	289.2833	272
5	50901	General Arts	256	254.0703	211	120	254.4417	217
6	70102	General Arts	440	357.8523	300	120	366.1250	345
7	70602	Business	320	328.9750	277	40	350.4500	337
8	70107	General Arts	87	250.8621	213	54	256.8704	216
9	70105	General Arts	275	249.9818	199	103	249.4854	210
10	70605	Home Economics	291	253.2887	202	40	247.5500	221
11	70603	General Arts	360	274.0028	210	120	284.6250	261
12	50702	Business	600	283.9383	242	210	272.3952	242
13	50705	Home Economics	382	262.1387	218	60	261.0500	241
14	50115	Business	510	327.7510	298	160	326.8625	302
15	50706	Home Economics	55	247.2545	214	20	249.7000	216
16	51603	Home Economics	493	310.5112	228	50	316.7800	301
17	50703	Business	499	266.0060	212	149	257.1477	212

Showing 1 to 18 of 3,080 entries, 8 total columns

```
+   left_join(ad_size, by = "schoolcode")%>%
+   left_join(school_quality, by = "schoolcode") %>%
+   left_join(school_cutoff, by = "schoolcode") %>%
+   left_join(program_size, by = c("schoolcode", "choicepgm")) %>%
+   left_join(program_quality, by = c("schoolcode", "choicepgm")) %>%
```

Exercise 3

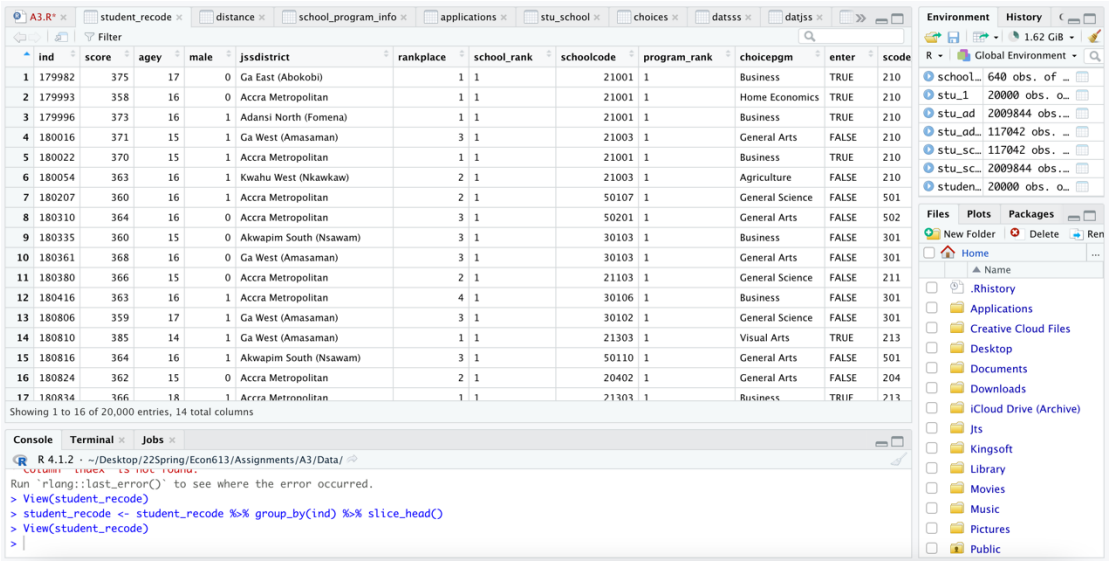


olname	sssdistrict	ssslong	ssslat	X	jsslong	jsslat	near	distance
	Kumasi Metro	NA	NA	23	-1.5627517	6.559323	NA	NA
ICAN SENIOR HIGH SCHOOL, ASEM-KUMASI	Kumasi Metro	-1.59718716	6.682060	23	-1.5627517	6.559323	FALSE	8.813579
E SENIOR HIGH SCHOOL, TOASE	Atwima / Nwabiagya (Nkawie)	-1.80875707	6.681337	23	-1.5627517	6.559323	FALSE	18.895053
E SENIOR HIGH SCHOOL, TOASE	Atwima / Nwabiagya (Nkawie)	-1.80875707	6.681337	23	-1.5627517	6.559323	FALSE	18.895053
S SENIOR HIGH. COMM. SCHOOL, FAWOADE	Kwabre (Mamponteng)	-1.54142010	6.806778	23	-1.5627517	6.559323	FALSE	17.179653
MAN ANGLICAN SENIOR HIGH. SCHOOL, EJURA	Ejura/Sekyedumase (Ejura)	-1.36796534	7.462874	23	-1.5627517	6.559323	FALSE	63.917746
ULI SENIOR HIGH. SCHOOL, HO	Ho Municipal	0.52614224	6.717607	117	0.5261422	6.717607	TRUE	0.000000
DO SENIOR HIGH SCHOOL, KPANDO	Kpando	0.26738513	6.896852	117	0.5261422	6.717607	FALSE	21.672792
FE COMM. SENIOR HIGH. SCHOOL, TAVIEFE	Ho Municipal	0.52614224	6.717607	117	0.5261422	6.717607	TRUE	0.000000
ZE SENIOR HIGH SCHOOL, KPEDZE	Ho Municipal	0.52614224	6.717607	117	0.5261422	6.717607	TRUE	0.000000
	Kpando	NA	NA	117	0.5261422	6.717607	NA	NA
	South Dayi	NA	NA	117	0.5261422	6.717607	NA	NA
S SENIOR HIGH. COMM. SCHOOL, FAWOADE	Kwabre (Mamponteng)	-1.54142010	6.806778	27	-1.5414201	6.806778	TRUE	0.000000
ADJEI SENIOR HIGH/TECHNICAL SCHOOL, BAMPE...	Kwabre (Mamponteng)	-1.54142010	6.806778	27	-1.5414201	6.806778	TRUE	0.000000
NTIST SENIOR HIGH SCHOOL, KUMASI	Kumasi Metro	-1.59718716	6.682060	27	-1.5414201	6.806778	FALSE	9.439135
MA PENSAN SENIOR HIGH./TECH., ABOASO-ASH...	Kwabre (Mamponteng)	-1.54142010	6.806778	27	-1.5414201	6.806778	TRUE	0.000000
N SENIOR HIGH SCHOOL, JUABEN	Fiisu/Juaben (Fiisu)	-1.38873518	6.707927	27	-1.5414201	6.806778	FALSE	12.519350

Showing 1 to 16 of 2,009,844 entries, 23 total columns

```
+   mutate(near = jsslong == ssslong & jsslat == ssslat)
> distance <- stu_school_loc %>%  mutate(distance = sqrt( (69.172 * (ssslong-jsslong) * cos(jsslat / 57.3) )^2 + (69.172 * (ssslat-jsslat)
 )^2  )   )
> View(distance)
>
```

Exercise 4



	ind	score	agey	male	jssdistrict	rankplace	school_rank	schoolcode	program_rank	choicepgm	enter	scode
1	179982	375	17	0	Ga East (Abokobi)	1	1	21001	1	Business	TRUE	210
2	179993	358	16	0	Accra Metropolitan	1	1	21001	1	Home Economics	TRUE	210
3	179996	373	16	1	Adansi North (Fomena)	1	1	21001	1	Business	TRUE	210
4	180016	371	15	1	Ga West (Amasaman)	3	1	21003	1	General Arts	FALSE	210
5	180022	370	15	1	Accra Metropolitan	1	1	21001	1	Business	TRUE	210
6	180054	363	16	1	Kwahu West (Nkawkaw)	2	1	21003	1	Agriculture	FALSE	210
7	180207	360	16	1	Accra Metropolitan	2	1	50107	1	General Science	FALSE	501
8	180310	364	16	0	Accra Metropolitan	3	1	50201	1	General Arts	FALSE	502
9	180335	360	15	0	Akwapim South (Nsawam)	3	1	30103	1	Business	FALSE	301
10	180361	368	16	0	Ga West (Amasaman)	3	1	30103	1	General Arts	FALSE	301
11	180380	366	15	0	Accra Metropolitan	2	1	21103	1	General Science	FALSE	211
12	180416	363	16	1	Accra Metropolitan	4	1	30106	1	Business	FALSE	301
13	180806	359	17	1	Ga West (Amasaman)	3	1	30102	1	General Science	FALSE	301
14	180810	385	14	1	Ga West (Amasaman)	1	1	21303	1	Visual Arts	TRUE	213
15	180816	364	16	1	Akwapim South (Nsawam)	3	1	50110	1	General Arts	FALSE	501
16	180824	362	15	0	Accra Metropolitan	2	1	20402	1	General Arts	FALSE	204
17	180834	366	18	1	Accra Metropolitan	1	1	21303	1	Business	TRUE	213

Exercise 5

```
> mlogit_result_1
  (Intercept):100_science      (Intercept):101_arts (Intercept):101_economics    (Intercept):101_others
 (Intercept):101_science
            34.374138481             -13.987155415             -25.899638153              -5.492409065
          -30.109985411
(Intercept):102_economics   (Intercept):102_science (Intercept):105_economics      (Intercept):201_arts (I
ntercept):201_economics
            27.985204091              -0.680621321              -2.672694222              -9.469662035
           34.374138481
  (Intercept):201_science      (Intercept):203_arts (Intercept):203_economics   (Intercept):203_science
   (Intercept):204_arts
           -16.086426845             -23.372687897             -22.065546078               7.107823672
          121.704614951
  (Intercept):204_science      (Intercept):210_arts (Intercept):210_economics    (Intercept):210_others
 (Intercept):210_science
```

Exercise 6

```
> mlogit_result_2
       (Intercept):101_arts    (Intercept):101_economics      (Intercept):101_science
                -6.807850e+01                -3.893842e+01                -8.125061e+01
   (Intercept):102_economics        (Intercept):201_arts    (Intercept):201_economics
                -3.578985e+01                -4.775199e+01                -5.225508e+01
      (Intercept):201_others      (Intercept):201_science       (Intercept):203_arts
                -2.919556e+01                -5.566089e+01                -8.540616e+01
   (Intercept):203_economics      (Intercept):203_science       (Intercept):204_arts
                -8.609930e+01                -8.540616e+01                -4.799607e+01
     (Intercept):204_science        (Intercept):210_arts    (Intercept):210_economics
                -4.799607e+01                -9.369444e+01                -9.438759e+01
      (Intercept):210_others      (Intercept):210_science       (Intercept):211_arts
                -9.438759e+01                -9.300130e+01                -9.782493e+01
   (Intercept):211_economics      (Intercept):211_science       (Intercept):213_arts
                -9.851807e+01                -9.782493e+01                -2.983384e+01
```