SAS Program-Homework

Obs	X1	X2	X3
1	Govt_job	formerly	253.93
2	Govt_job	formerly	112.95
3	Govt_job	formerly	86.91
4	Govt_job	formerly	223.35
5	Govt_job	formerly	63.16
6	Govt_job	formerly	71.79
7	Govt_job	formerly	72.94
8	Govt_job	formerly	93.71
9	Govt_job	formerly	244.28
10	Govt_job	formerly	167.59
11	Govt_job	formerly	88.65
12	Govt_job	formerly	112.33
13	Govt_job	formerly	103.55
14	Govt_job	formerly	110.36
15	Govt_job	formerly	97.86
16	Govt_job	formerly	55.57
17	Govt_job	formerly	57.02
18	Govt_job	formerly	88.66
19	Govt_job	formerly	91.65
20	Govt_job	formerly	219.80
21	Govt_job	formerly	57.17
22	Govt_job	formerly	208.39
23	Govt_job	formerly	60.34
24	Govt_job	formerly	85.64
25	Govt_job	formerly	58.29
26	Govt_job	formerly	217.94
27	Govt_job	formerly	157.67
28	Govt_job	formerly	72.08
29	Govt_job	formerly	88.81
30	Govt_job	formerly	79.92
31	Govt_job	formerly	78.92
32	Govt_job	formerly	227.89

33	Govt_job	formerly	105.72
34	Govt_job	formerly	72.20
35	Govt_job	formerly	103.43
36	Govt_job	formerly	239.64
37	Govt_job	formerly	61.94
38	Govt_job	formerly	95.07
39	Govt_job	formerly	85.62
40	Govt_job	formerly	95.16
41	Govt_job	formerly	121.17
42	Govt_job	formerly	103.44
43	Govt_job	formerly	80.88
44	Govt_job	formerly	118.82
45	Govt_job	formerly	96.75
46	Govt_job	formerly	112.98
47	Govt_job	formerly	80.01
48	Govt_job	formerly	59.74
49	Govt_job	formerly	160.87
50	Govt_job	formerly	83.60
51	Govt_job	never_sm	76.98
52	Govt_job	never_sm	64.40
53	Govt_job	never_sm	206.33
54	Govt_job	never_sm	74.80
55	Govt_job	never_sm	183.87
56	Govt_job	never_sm	216.07
57	Govt_job	never_sm	100.97
58	Govt_job	never_sm	90.55
59	Govt_job	never_sm	82.81
60	Govt_job	never_sm	115.99
61	Govt_job	never_sm	65.93
62	Govt_job	never_sm	64.17
63	Govt_job	never_sm	104.86
64	Govt_job	never_sm	123.04
65	Govt_job	never_sm	133.58
66	Govt_job	never_sm	85.17
67	Govt_job	never_sm	69.11

	Govt_job	never_sm	86.39
69	Govt_job	never_sm	120.06
70	Govt_job	never_sm	105.52
71	Govt_job	never_sm	237.74
72	Govt_job	never_sm	79.98
73	Govt_job	never_sm	73.04
74	Govt_job	never_sm	88.00
75	Govt_job	never_sm	68.68
76	Govt_job	never_sm	131.41
77	Govt_job	never_sm	129.43
78	Govt_job	never_sm	67.07
79	Govt_job	never_sm	107.42
80	Govt_job	never_sm	74.29
81	Govt_job	never_sm	93.93
82	Govt_job	never_sm	117.69
83	Govt_job	never_sm	59.43
84	Govt_job	never_sm	69.17
85	Govt_job	never_sm	115.93
86	Govt_job	never_sm	113.85
87	Govt_job	never_sm	211.12
88	Govt_job	never_sm	266.59
89	Govt_job	never_sm	56.63
90	Govt_job	never_sm	92.59
91	Govt_job	never_sm	158.33
92	Govt_job	never_sm	92.13
93	Govt_job	never_sm	70.28
94	Govt_job	never_sm	96.18
95	Govt_job	never_sm	98.91
96	Govt_job	never_sm	87.49
97	Govt_job	never_sm	83.88
98	Govt_job	never_sm	105.77
99	Govt_job	never_sm	197.11
100	Govt_job	never_sm	91.61
101	Govt_job	smokes	65.12
102	Govt_job	smokes	90.31

	Govt_job	smokes	82.09
104	Govt_job	smokes	55.47
105	Govt_job	smokes	80.88
106	Govt_job	smokes	229.86
107	Govt_job	smokes	82.02
108	Govt_job	smokes	216.00
109	Govt_job	smokes	133.24
110	Govt_job	smokes	111.10
111	Govt_job	smokes	73.54
112	Govt_job	smokes	154.03
113	Govt_job	smokes	101.81
114	Govt_job	smokes	103.08
115	Govt_job	smokes	83.01
116	Govt_job	smokes	87.62
117	Govt_job	smokes	95.75
118	Govt_job	smokes	226.93
119	Govt_job	smokes	101.76
120	Govt_job	smokes	71.71
121	Govt_job	smokes	64.40
122	Govt_job	smokes	160.76
123	Govt_job	smokes	73.75
124	Govt_job	smokes	85.53
125	Govt_job	smokes	74.11
126	Govt_job	smokes	69.88
127	Govt_job	smokes	219.39
128	Govt_job	smokes	69.23
129	Govt_job	smokes	92.32
130	Govt_job	smokes	99.69
131	Govt_job	smokes	88.20
132	Govt_job	smokes	72.53
133	Govt_job	smokes	80.86
134	Govt_job	smokes	100.31
135	Govt_job	smokes	162.24
136	Govt_job	smokes	113.05
137	Govt_job	smokes	73.07

	Govt_job	smokes	101.81
139	Govt_job	smokes	77.99
140	Govt_job	smokes	81.38
141	Govt_job	smokes	101.41
142	Govt_job	smokes	81.60
143	Govt_job	smokes	193.94
144	Govt_job	smokes	124.64
145	Govt_job	smokes	56.96
146	Govt_job	smokes	57.33
147	Govt_job	smokes	70.53
148	Govt_job	smokes	73.48
149	Govt_job	smokes	72.96
150	Govt_job	smokes	87.10
151	Private	formerly	72.02
152	Private	formerly	86.94
153	Private	formerly	65.01
154	Private	formerly	82.06
155	Private	formerly	95.38
156	Private	formerly	110.85
157	Private	formerly	106.83
158	Private	formerly	74.63
159	Private	formerly	66.46
160	Private	formerly	60.20
161	Private	formerly	120.94
162	Private	formerly	209.50
163	Private	formerly	116.66
164	Private	formerly	79.34
165	Private	formerly	117.63
166	Private	formerly	63.32
167	Private	formerly	101.46
168	Private	formerly	105.28
169	Private	formerly	69.26
170	Private	formerly	74.12
171	Private	formerly	65.66
172	Private	formerly	81.99

	Private	formerly	61.80
174	Private	formerly	89.21
175	Private	formerly	84.09
176	Private	formerly	82.71
177	Private	formerly	57.82
178	Private	formerly	186.21
179	Private	formerly	226.11
180	Private	formerly	81.96
181	Private	formerly	83.30
182	Private	formerly	114.50
183	Private	formerly	83.89
184	Private	formerly	116.20
185	Private	formerly	170.22
186	Private	formerly	125.11
187	Private	formerly	56.48
188	Private	formerly	57.89
189	Private	formerly	74.70
190	Private	formerly	216.64
191	Private	formerly	80.81
192	Private	formerly	94.34
193	Private	formerly	83.93
194	Private	formerly	74.14
195	Private	formerly	56.11
196	Private	formerly	209.26
197	Private	formerly	88.41
198	Private	formerly	229.20
199	Private	formerly	220.36
200	Private	formerly	63.71
201	Private	never_sm	109.46
202	Private	never_sm	77.95
203	Private	never_sm	95.52
204	Private	never_sm	90.51
205	Private	never_sm	133.82
206	Private	never_sm	82.18
207	Private	never_sm	71.30

	Private	never_sm	185.27
209	Private	never_sm	67.92
210	Private	never_sm	80.97
211	Private	never_sm	91.01
212	Private	never_sm	81.68
213	Private	never_sm	249.31
214	Private	never_sm	87.40
215	Private	never_sm	86.06
216	Private	never_sm	70.11
217	Private	never_sm	69.40
218	Private	never_sm	74.91
219	Private	never_sm	75.04
220	Private	never_sm	98.05
221	Private	never_sm	80.08
222	Private	never_sm	96.02
223	Private	never_sm	119.52
224	Private	never_sm	85.84
225	Private	never_sm	89.33
226	Private	never_sm	76.93
227	Private	never_sm	99.92
228	Private	never_sm	78.18
229	Private	never_sm	204.63
230	Private	never_sm	122.25
231	Private	never_sm	106.56
232	Private	never_sm	56.42
233	Private	never_sm	90.60
234	Private	never_sm	119.13
235	Private	never_sm	93.05
236	Private	never_sm	89.68
237	Private	never_sm	111.48
238	Private	never_sm	68.72
239	Private	never_sm	66.30
240	Private	never_sm	78.29
241	Private	never_sm	98.02
242	Private	never_sm	84.31

	Private	never_sm	93.90
244	Private	never_sm	82.64
245	Private	never_sm	107.82
246	Private	never_sm	93.80
247	Private	never_sm	65.16
248	Private	never_sm	64.45
249	Private	never_sm	107.46
250	Private	never_sm	96.98
251	Private	smokes	70.56
252	Private	smokes	93.96
253	Private	smokes	254.95
254	Private	smokes	97.73
255	Private	smokes	217.55
256	Private	smokes	64.41
257	Private	smokes	131.19
258	Private	smokes	107.06
259	Private	smokes	87.12
260	Private	smokes	85.18
261	Private	smokes	63.82
262	Private	smokes	59.26
263	Private	smokes	242.30
264	Private	smokes	80.35
265	Private	smokes	93.51
266	Private	smokes	206.66
267	Private	smokes	75.50
268	Private	smokes	78.29
269	Private	smokes	122.41
270	Private	smokes	110.47
271	Private	smokes	94.96
272	Private	smokes	145.18
273	Private	smokes	58.09
274	Private	smokes	105.63
275	Private	smokes	206.52
276	Private	smokes	97.95
277	Private	smokes	191.48

	Private	smokes	81.25
279	Private	smokes	91.23
280	Private	smokes	61.45
281	Private	smokes	100.42
282	Private	smokes	81.76
283	Private	smokes	82.61
284	Private	smokes	139.90
285	Private	smokes	118.85
286	Private	smokes	102.16
287	Private	smokes	108.82
288	Private	smokes	95.57
289	Private	smokes	144.16
290	Private	smokes	60.06
291	Private	smokes	89.68
292	Private	smokes	60.77
293	Private	smokes	102.07
294	Private	smokes	57.51
295	Private	smokes	114.33
296	Private	smokes	112.77
297	Private	smokes	60.69
298	Private	smokes	79.83
299	Private	smokes	86.99
300	Private	smokes	116.85
301	Self-emp	formerly	194.37
302	Self-emp	formerly	89.45
303	Self-emp	formerly	86.05
304	Self-emp	formerly	252.72
305	Self-emp	formerly	56.31
306	Self-emp	formerly	84.79
307	Self-emp	formerly	68.84
308	Self-emp	formerly	236.79
309	Self-emp	formerly	207.64
310	Self-emp	formerly	71.15
311	Self-emp	formerly	207.96
312	Self-emp	formerly	59.68

	Self-emp	formerly	94.45
314	Self-emp	formerly	103.37
315	Self-emp	formerly	70.29
316	Self-emp	formerly	209.15
317	Self-emp	formerly	105.76
318	Self-emp	formerly	101.22
319	Self-emp	formerly	79.30
320	Self-emp	formerly	87.41
321	Self-emp	formerly	87.15
322	Self-emp	formerly	214.51
323	Self-emp	formerly	81.15
324	Self-emp	formerly	228.92
325	Self-emp	formerly	111.81
326	Self-emp	formerly	169.43
327	Self-emp	formerly	70.73
328	Self-emp	formerly	261.67
329	Self-emp	formerly	87.16
330	Self-emp	formerly	89.73
331	Self-emp	formerly	208.31
332	Self-emp	formerly	102.73
333	Self-emp	formerly	96.04
334	Self-emp	formerly	79.69
335	Self-emp	formerly	104.07
336	Self-emp	formerly	56.11
337	Self-emp	formerly	99.15
338	Self-emp	formerly	112.64
339	Self-emp	formerly	202.21
340	Self-emp	formerly	111.98
341	Self-emp	formerly	188.13
342	Self-emp	formerly	114.01
343	Self-emp	formerly	81.54
344	Self-emp	formerly	83.12
345	Self-emp	formerly	78.70
346	Self-emp	formerly	180.63
347	Self-emp	formerly	119.30

	Self-emp	formerly	115.91
349	Self-emp	formerly	77.46
350	Self-emp	formerly	107.47
351	Self-emp	never_sm	88.68
352	Self-emp	never_sm	82.81
353	Self-emp	never_sm	85.82
354	Self-emp	never_sm	94.64
355	Self-emp	never_sm	75.19
356	Self-emp	never_sm	127.57
357	Self-emp	never_sm	180.80
358	Self-emp	never_sm	106.68
359	Self-emp	never_sm	66.71
360	Self-emp	never_sm	112.37
361	Self-emp	never_sm	207.62
362	Self-emp	never_sm	85.29
363	Self-emp	never_sm	106.84
364	Self-emp	never_sm	151.30
365	Self-emp	never_sm	81.95
366	Self-emp	never_sm	192.16
367	Self-emp	never_sm	110.41
368	Self-emp	never_sm	82.35
369	Self-emp	never_sm	84.85
370	Self-emp	never_sm	204.77
371	Self-emp	never_sm	65.29
372	Self-emp	never_sm	71.66
373	Self-emp	never_sm	74.36
374	Self-emp	never_sm	90.43
375	Self-emp	never_sm	210.23
376	Self-emp	never_sm	78.14
377	Self-emp	never_sm	190.92
378	Self-emp	never_sm	103.60
379	Self-emp	never_sm	60.73
380	Self-emp	never_sm	211.58
381	Self-emp	never_sm	205.84
382	Self-emp	never_sm	57.42

	Self-emp	never_sm	94.89
384	Self-emp	never_sm	59.20
385	Self-emp	never_sm	93.60
386	Self-emp	never_sm	70.23
387	Self-emp	never_sm	156.45
388	Self-emp	never_sm	79.77
389	Self-emp	never_sm	111.36
390	Self-emp	never_sm	115.03
391	Self-emp	never_sm	192.37
392	Self-emp	never_sm	228.20
393	Self-emp	never_sm	174.12
394	Self-emp	never_sm	142.12
395	Self-emp	never_sm	74.32
396	Self-emp	never_sm	68.40
397	Self-emp	never_sm	193.61
398	Self-emp	never_sm	69.12
399	Self-emp	never_sm	70.94
400	Self-emp	never_sm	194.99
401	Self-emp	smokes	132.08
402	Self-emp	smokes	126.39
403	Self-emp	smokes	207.32
404	Self-emp	smokes	216.88
405	Self-emp	smokes	114.45
406	Self-emp	smokes	73.41
407	Self-emp	smokes	110.33
408	Self-emp	smokes	93.17
409	Self-emp	smokes	139.87
410	Self-emp	smokes	86.40
411	Self-emp	smokes	72.09
412	Self-emp	smokes	67.84
413	Self-emp	smokes	84.31
414	Self-emp	smokes	160.64
415	Self-emp	smokes	209.90
416	Self-emp	smokes	106.10
417	Self-emp	smokes	68.44

	Self-emp	smokes	128.04
419	Self-emp	smokes	135.19
420	Self-emp	smokes	67.06
421	Self-emp	smokes	251.46
422	Self-emp	smokes	83.64
423	Self-emp	smokes	229.92
424	Self-emp	smokes	82.85
425	Self-emp	smokes	94.71
426	Self-emp	smokes	103.69
427	Self-emp	smokes	95.01
428	Self-emp	smokes	84.43
429	Self-emp	smokes	97.99
430	Self-emp	smokes	85.92
431	Self-emp	smokes	99.83
432	Self-emp	smokes	93.58
433	Self-emp	smokes	76.11
434	Self-emp	smokes	65.71
435	Self-emp	smokes	70.43
436	Self-emp	smokes	62.93
437	Self-emp	smokes	201.45
438	Self-emp	smokes	239.95
439	Self-emp	smokes	114.54
440	Self-emp	smokes	90.38
441	Self-emp	smokes	142.31
442	Self-emp	smokes	55.32
443	Self-emp	smokes	76.09
444	Self-emp	smokes	123.08
445	Self-emp	smokes	60.77
446	Self-emp	smokes	195.23
447	Self-emp	smokes	101.57
448	Self-emp	smokes	68.37
449	Self-emp	smokes	248.24
450	Self-emp	smokes	92.90

SAS Program-Homework

The UNIVARIATE Procedure
Variable: X3 (X3 - avg_glucose_level)

Moments			
N	450	Sum Weights	450
Mean	110.498311	Sum Observations	49724.24
Std Deviation	50.9269292	Variance	2593.55211
Skewness	1.37344053	Kurtosis	0.80345419
Uncorrected SS	6658949.44	Corrected SS	1164504.9
Coeff Variation	46.0884231	Std Error Mean	2.40071846

Basic Statistical Measures			
Location		Variability	
Mean	110.4983	Std Deviation	50.92693
Median	92.9750	Variance	2594
Mode	56.1100	Range	211.27000
		Interquartile Range	42.74000

Note: The mode displayed is the smallest of 9 modes with a count of 2.

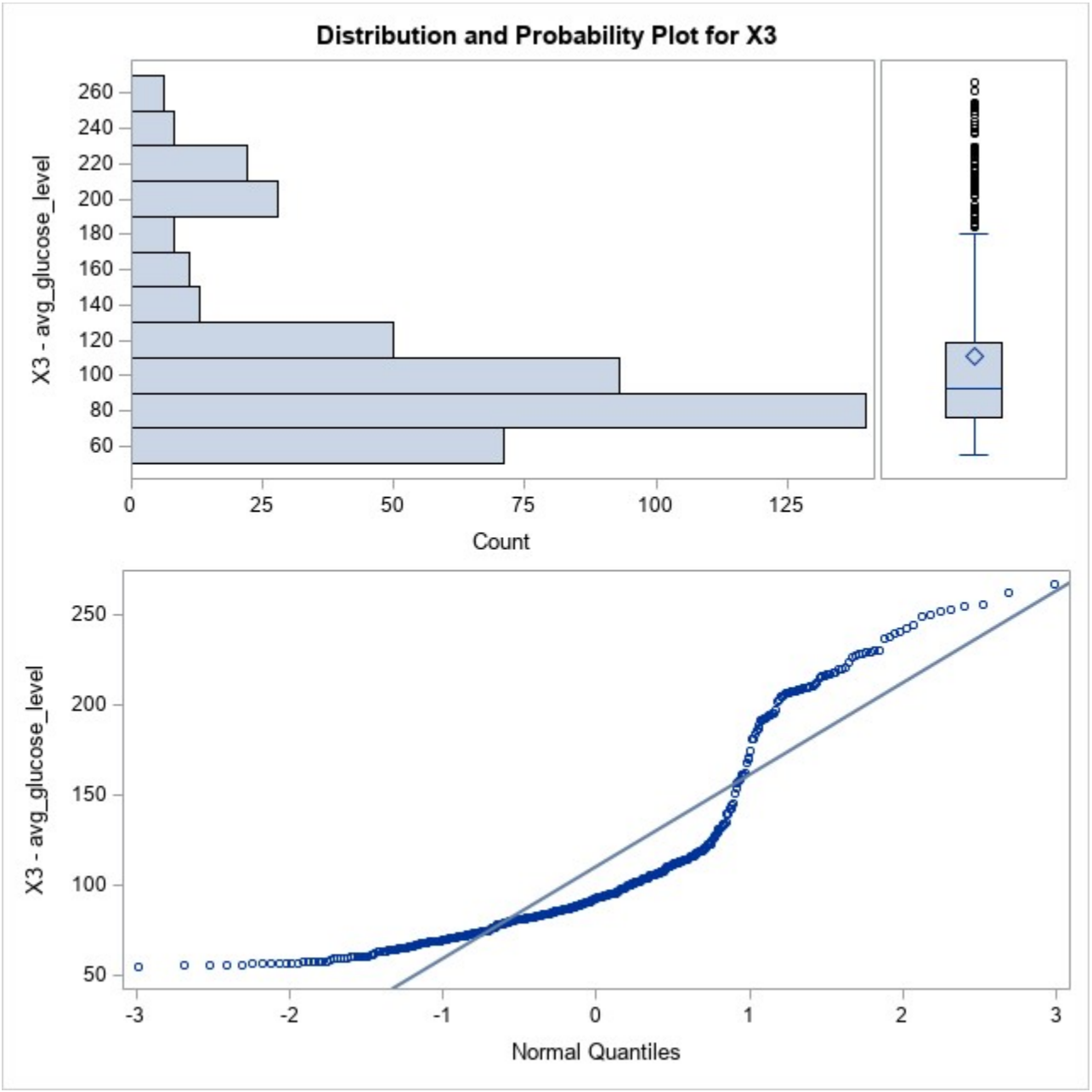
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	46.02718	Pr > |t|	<.0001
Sign	M	225	Pr >= |M|	<.0001
Signed Rank	S	50737.5	Pr >= |S|	<.0001

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.811996	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.195039	Pr > D	<0.0100
Cramer-von Mises	W-Sq	5.765191	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	32.35071	Pr > A-Sq	<0.0050

Quantiles (Definition 5)	
Level	Quantile

100% Max	266.590
99%	252.720
95%	223.350
90%	207.470
75% Q3	118.850
50% Median	92.975
25% Q1	76.110
10%	65.065
5%	59.680
1%	56.110
0% Min	55.320

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
55.32	442	252.72	304
55.47	104	253.93	1
55.57	16	254.95	253
56.11	336	261.67	328
56.11	195	266.59	88


Distribution and Probability Plot for X3
X3 - avg_glucose_level
260
240
220
200
180
160
140
120
100
80
60
0
25
50
75
100
125
Count
8
X3 - avg_glucose_level
250
200
150
100
50
-3
-2
-1
0
1
2
3
Normal Quantiles

SAS Program-Homework

The UNIVARIATE Procedure
Variable: X3 (X3 - avg_glucose_level)

X1 - work_status=Govt_job

Moments			
N	150	Sum Weights	150
Mean	108.788133	Sum Observations	16318.22
Std Deviation	50.7874567	Variance	2579.36575
Skewness	1.49856909	Kurtosis	1.26533683
Uncorrected SS	2159554.19	Corrected SS	384325.497
Coeff Variation	46.6847395	Std Error Mean	4.14677847

Basic Statistical Measures			
Location		Variability	
Mean	108.7881	Std Deviation	50.78746
Median	91.6300	Variance	2579
Mode	64.4000	Range	211.12000
		Interquartile Range	42.24000

Note: The mode displayed is the smallest of 3 modes with a count of 2.

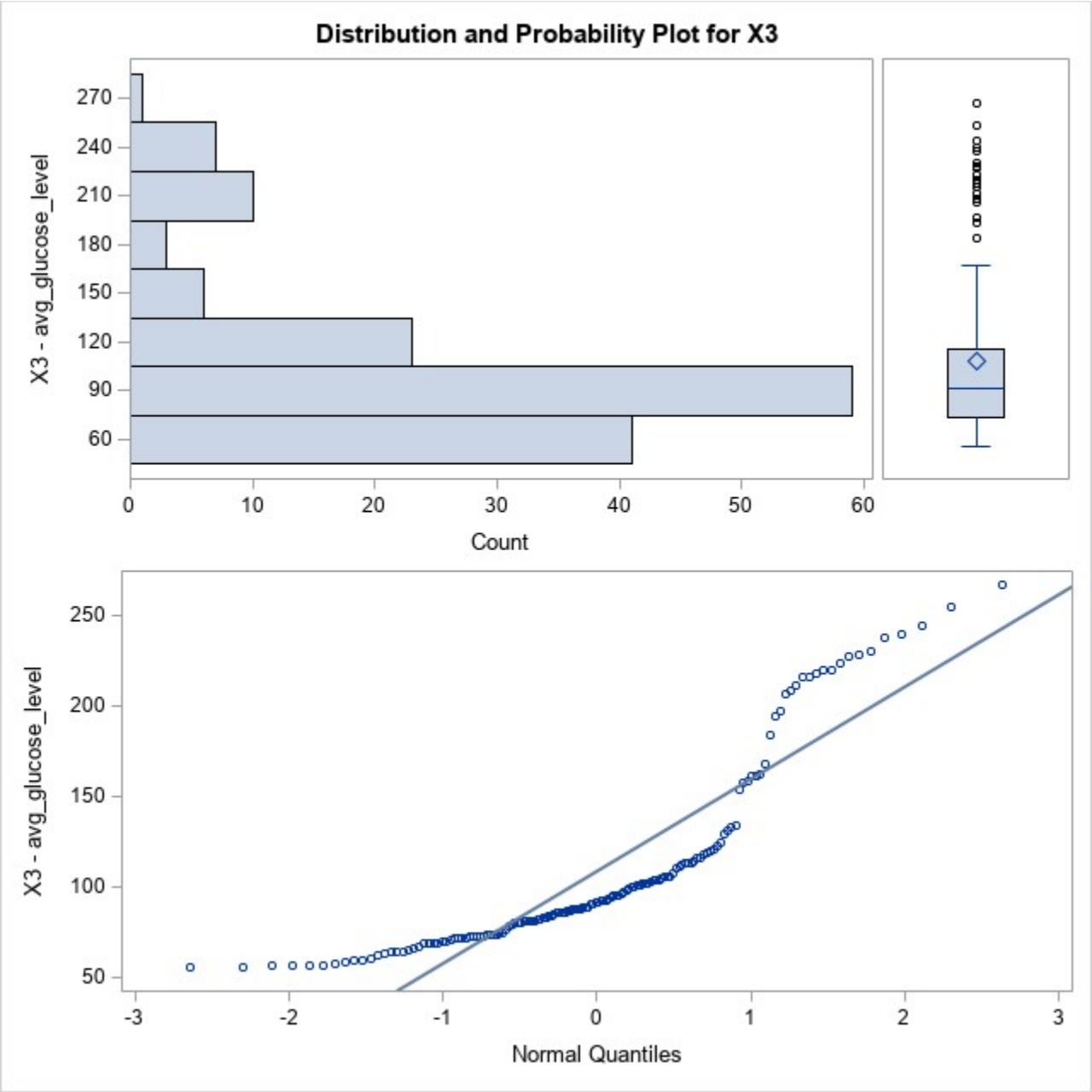
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	26.23437	Pr > |t|	<.0001
Sign	M	75	Pr >= |M|	<.0001
Signed Rank	S	5662.5	Pr >= |S|	<.0001

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.798741	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.210361	Pr > D	<0.0100
Cramer-von Mises	W-Sq	1.98879	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	11.27521	Pr > A-Sq	<0.0050

Quantiles (Definition 5)

Level	Quantile
100% Max	266.590
99%	253.930
95%	226.930
90%	209.755
75% Q3	115.990
50% Median	91.630
25% Q1	73.750
10%	64.400
5%	58.290
1%	55.570
0% Min	55.470

Extreme Observations					
Lowest			Highest		
Value	X1	Obs	Value	X1	Obs
55.47	Govt_job	104	237.74	Govt_job	71
55.57	Govt_job	16	239.64	Govt_job	36
56.63	Govt_job	89	244.28	Govt_job	9
56.96	Govt_job	145	253.93	Govt_job	1
57.02	Govt_job	17	266.59	Govt_job	88


Distribution and Probability Plot for X3
X3 - avg_glucose_level
270
240
210
180
150
120
90
60
0
10
20
30
40
50
60
Count
X3 - avg_glucose_level
250
200
150
100
50
-3
-2
-1
0
1
2
3
Normal Quantiles

SAS Program-Homework

The UNIVARIATE Procedure
Variable: X3 (X3 - avg_glucose_level)

X1 - work_status=Private

Moments			
N	150	Sum Weights	150
Mean	102.612067	Sum Observations	15391.81
Std Deviation	44.7762171	Variance	2004.90962
Skewness	1.79736074	Kurtosis	2.66014732
Uncorrected SS	1878116.97	Corrected SS	298731.533
Coeff Variation	43.6364051	Std Error Mean	3.65596281

Basic Statistical Measures			
Location		Variability	
Mean	102.6121	Std Deviation	44.77622
Median	89.5050	Variance	2005
Mode	78.2900	Range	198.84000
		Interquartile Range	35.81000

Note: The mode displayed is the smallest of 2 modes with a count of 2.

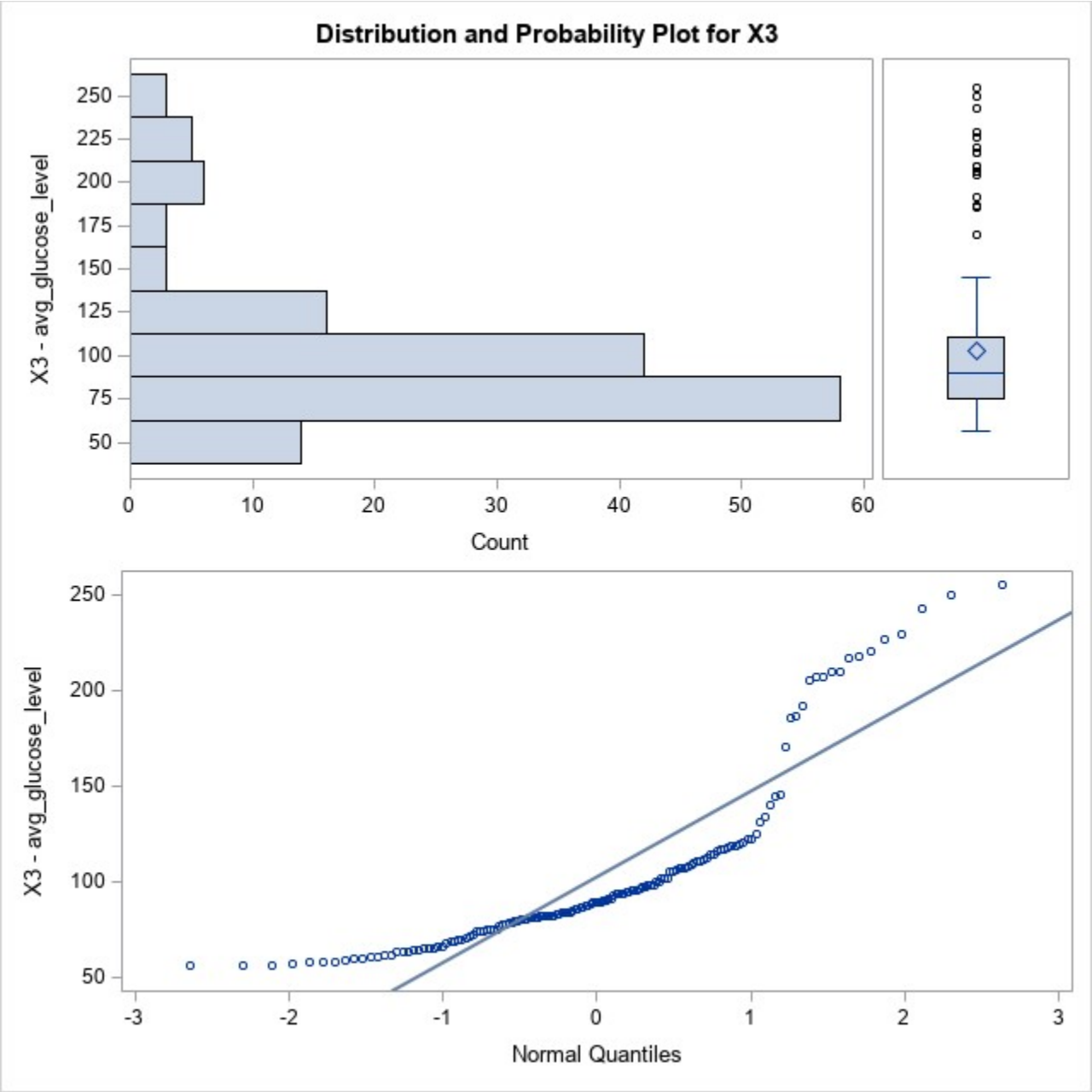
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	28.06704	Pr > |t|	<.0001
Sign	M	75	Pr >= |M|	<.0001
Signed Rank	S	5662.5	Pr >= |S|	<.0001

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.777652	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.187243	Pr > D	<0.0100
Cramer-von Mises	W-Sq	1.910197	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	11.29545	Pr > A-Sq	<0.0050

Quantiles (Definition 5)

Level	Quantile
100% Max	254.950
99%	249.310
95%	216.640
90%	185.740
75% Q3	110.850
50% Median	89.505
25% Q1	75.040
10%	63.515
5%	59.260
1%	56.420
0% Min	56.110

Extreme Observations					
Lowest			Highest		
Value	X1	Obs	Value	X1	Obs
56.11	Private	195	226.11	Private	179
56.42	Private	232	229.20	Private	198
56.48	Private	187	242.30	Private	263
57.51	Private	294	249.31	Private	213
57.82	Private	177	254.95	Private	253


Distribution and Probability Plot for X3
X3 - avg_glucose_level
250
225
200
175
150
125
100
75
50
0
10
20
30
40
50
60
Count
X3 - avg_glucose_level
250
200
150
100
50
-3
-2
-1
0
1
2
3
Normal Quantiles

SAS Program-Homework

The UNIVARIATE Procedure
Variable: X3 (X3 - avg_glucose_level)

X1 - work_status=Self-emp

Moments			
N	150	Sum Weights	150
Mean	120.094733	Sum Observations	18014.21
Std Deviation	55.4340129	Variance	3072.92978
Skewness	0.97062945	Kurtosis	-0.3805564
Uncorrected SS	2621278.28	Corrected SS	457866.538
Coeff Variation	46.1585711	Std Error Mean	4.5261682

Basic Statistical Measures			
Location		Variability	
Mean	120.0947	Std Deviation	55.43401
Median	98.5700	Variance	3073
Mode	.	Range	206.35000
		Interquartile Range	76.76000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	26.53342	Pr > |t|	<.0001
Sign	M	75	Pr >= |M|	<.0001
Signed Rank	S	5662.5	Pr >= |S|	<.0001

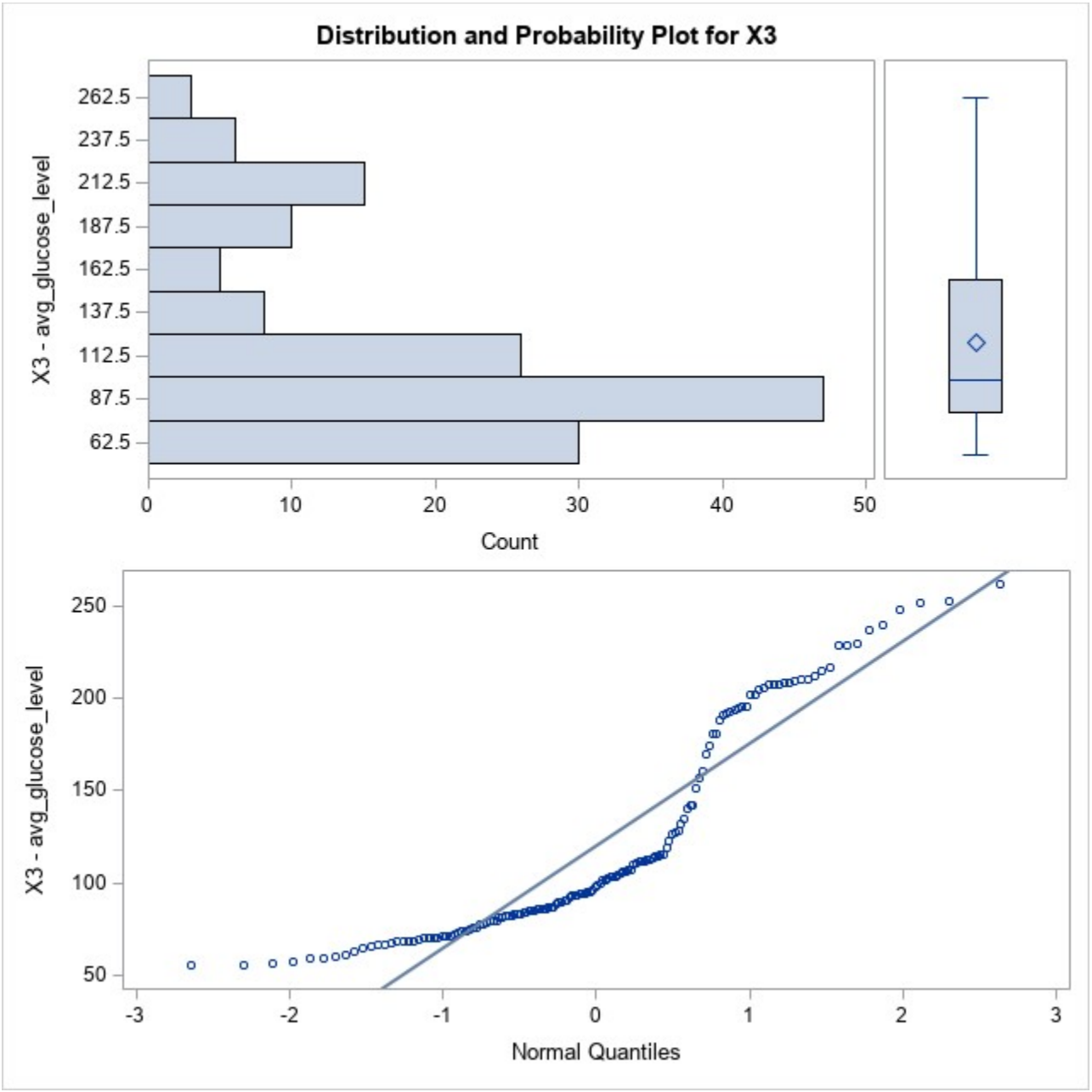
Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.849912	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.203421	Pr > D	<0.0100
Cramer-von Mises	W-Sq	1.661308	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	9.113478	Pr > A-Sq	<0.0050

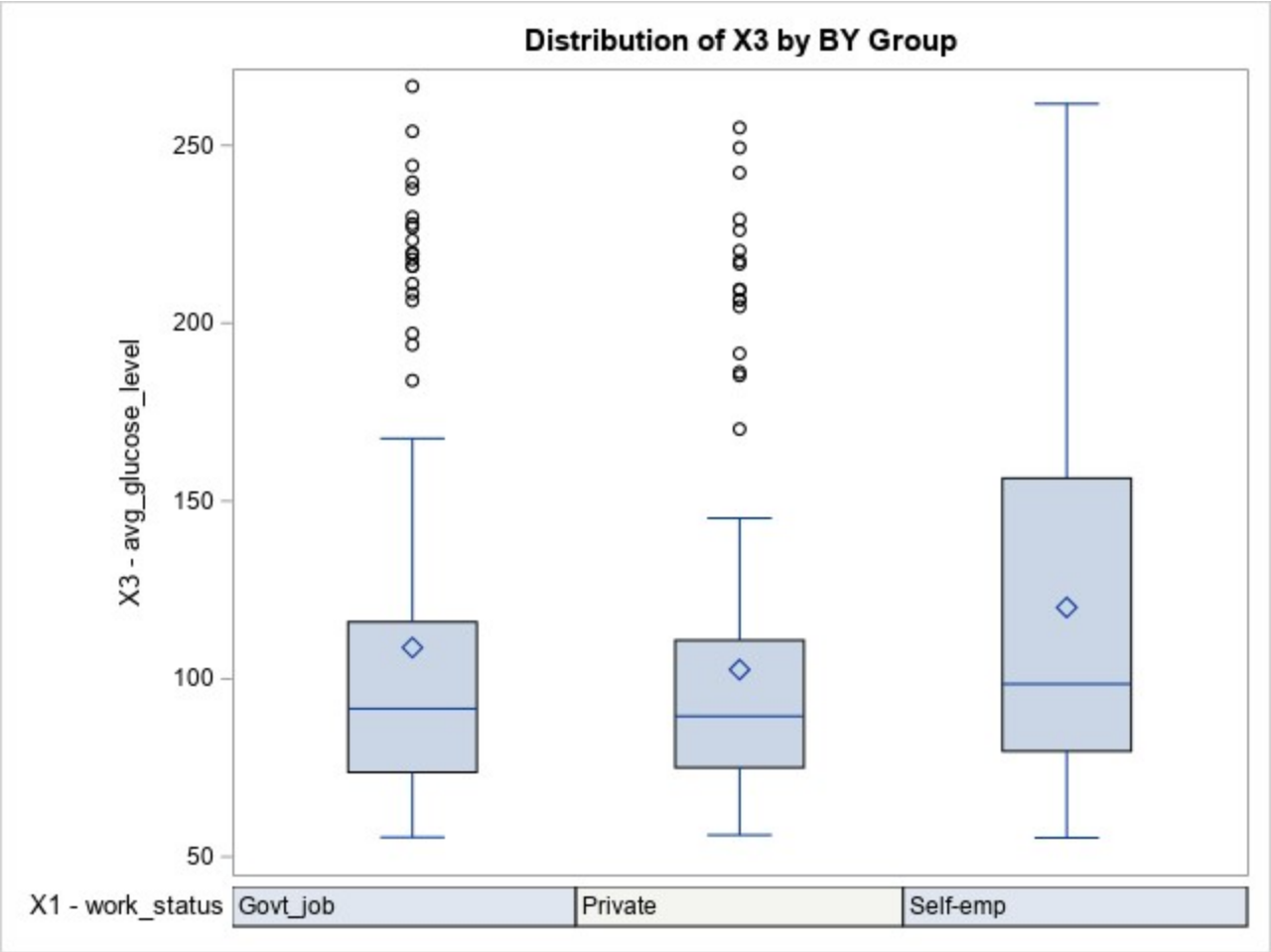
Quantiles (Definition 5)	
Level	Quantile
100% Max	261.670

99%	252.720
95%	228.920
90%	208.730
75% Q3	156.450
50% Median	98.570
25% Q1	79.690
10%	68.385
5%	60.770
1%	56.110
0% Min	55.320

Extreme Observations

Lowest			Highest		
Value	**X1**	**Obs**	**Value**	**X1**	**Obs**
55.32	Self-emp	442	239.95	Self-emp	438
56.11	Self-emp	336	248.24	Self-emp	449
56.31	Self-emp	305	251.46	Self-emp	421
57.42	Self-emp	382	252.72	Self-emp	304
59.20	Self-emp	384	261.67	Self-emp	328


Distribution and Probability Plot for X3
X3 - avg_glucose_level
262.5
237.5
212.5
187.5
162.5
137.5
112.5
87.5
62.5
0
10
20
30
40
50
Count
X3 - avg_glucose_level
250
200
150
100
50
-3
-2
-1
0
1
2
3
Normal Quantiles


Distribution of X3 by BY Group
X3 - avg_glucose_level
250
200
150
100
50
X1 - work_status
Govt_job
Private
Self-emp

SAS Program-Homework

The UNIVARIATE Procedure
Variable: X3 (X3 - avg_glucose_level)

X2 - smoke_status=formerly

Moments			
N	150	Sum Weights	150
Mean	113.793133	Sum Observations	17068.97
Std Deviation	55.6267511	Variance	3094.33544
Skewness	1.22522093	Kurtosis	0.19976844
Uncorrected SS	2403387.56	Corrected SS	461055.98
Coeff Variation	48.8841018	Std Error Mean	4.54190521

Basic Statistical Measures			
Location		Variability	
Mean	113.7931	Std Deviation	55.62675
Median	92.6800	Variance	3094
Mode	56.1100	Range	206.10000
		Interquartile Range	40.12000

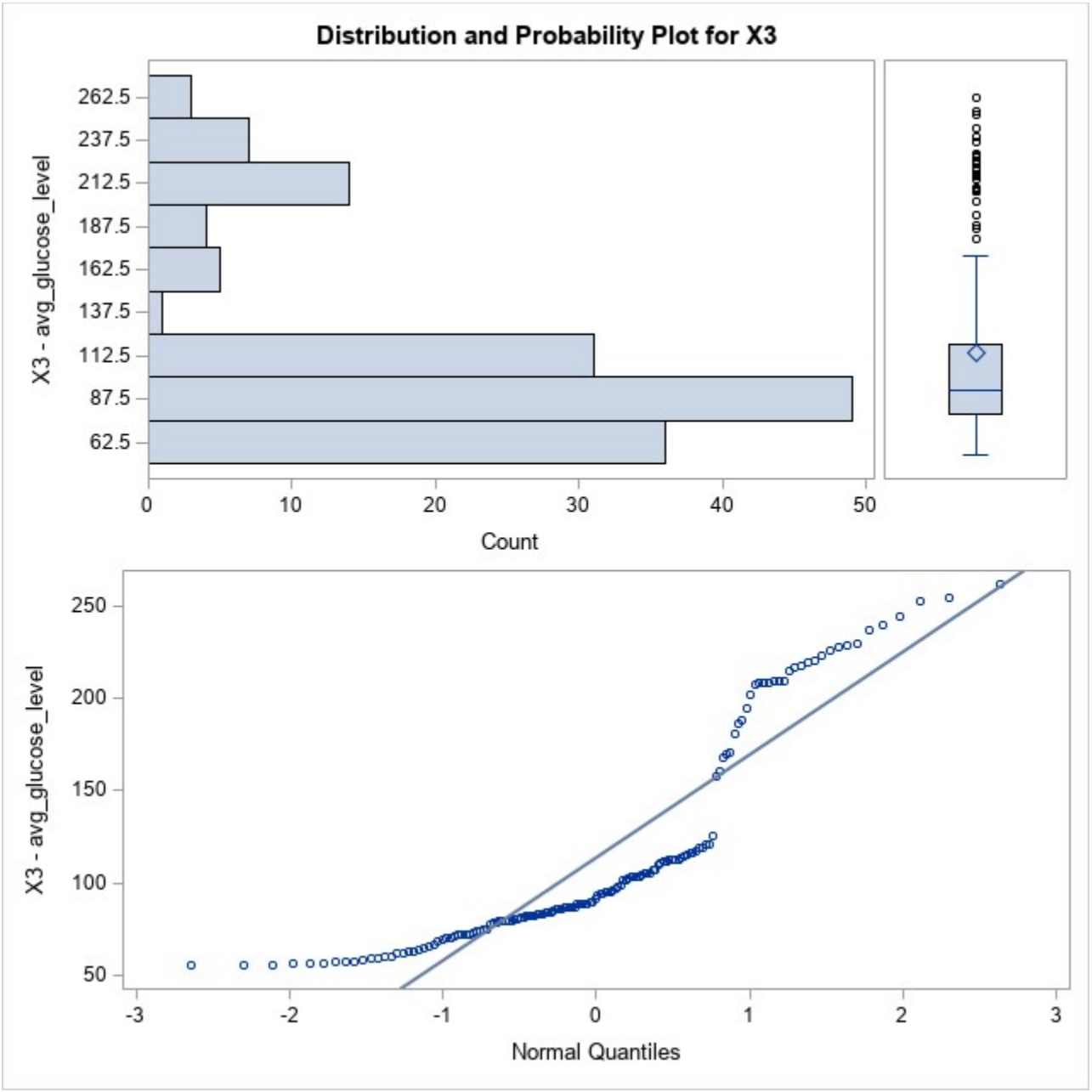
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	25.05405	Pr > |t|	<.0001
Sign	M	75	Pr >= |M|	<.0001
Signed Rank	S	5662.5	Pr >= |S|	<.0001

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.808337	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.220583	Pr > D	<0.0100
Cramer-von Mises	W-Sq	2.127389	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	11.65483	Pr > A-Sq	<0.0050

Quantiles (Definition 5)	
Level	Quantile
100% Max	261.670

99%	253.930
95%	228.920
90%	215.575
75% Q3	118.820
50% Median	92.680
25% Q1	78.700
10%	61.870
5%	57.820
1%	56.110
0% Min	55.570

Extreme Observations					
Lowest			Highest		
Value	**X2**	**Obs**	**Value**	**X2**	**Obs**
55.57	formerly	16	239.64	formerly	36
56.11	formerly	136	244.28	formerly	9
56.11	formerly	95	252.72	formerly	104
56.31	formerly	105	253.93	formerly	1
56.48	formerly	87	261.67	formerly	128


Distribution and Probability Plot for X3
X3 - avg_glucose_level
262.5
237.5
212.5
187.5
162.5
137.5
112.5
87.5
62.5
0
10
20
30
40
50
Count
X3 - avg_glucose_level
250
200
150
100
50
-3
-2
-1
0
1
2
3
Normal Quantiles

SAS Program-Homework

The UNIVARIATE Procedure
Variable: X3 (X3 - avg_glucose_level)

X2 - smoke_status=never_sm

Moments			
N	150	Sum Weights	150
Mean	108.329	Sum Observations	16249.35
Std Deviation	47.0871853	Variance	2217.20302
Skewness	1.45206689	Kurtosis	1.20884373
Uncorrected SS	2090639.09	Corrected SS	330363.25
Coeff Variation	43.4668328	Std Error Mean	3.84465258

Basic Statistical Measures			
Location		Variability	
Mean	108.3290	Std Deviation	47.08719
Median	91.8700	Variance	2217
Mode	82.8100	Range	210.17000
		Interquartile Range	40.76000

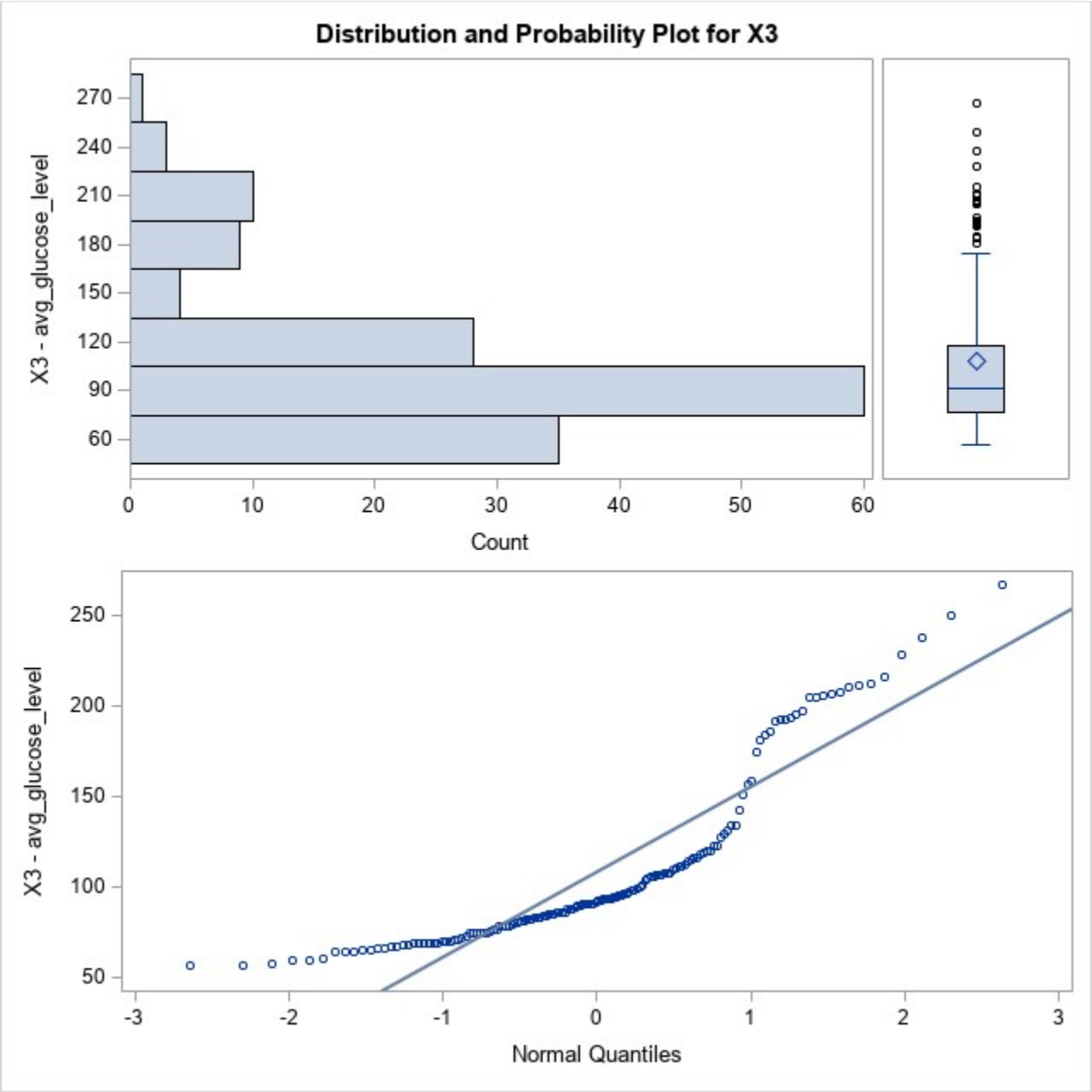
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	28.17654	Pr > |t|	<.0001
Sign	M	75	Pr >= |M|	<.0001
Signed Rank	S	5662.5	Pr >= |S|	<.0001

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.811808	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.190979	Pr > D	<0.0100
Cramer-von Mises	W-Sq	1.885309	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	10.63324	Pr > A-Sq	<0.0050

Quantiles (Definition 5)	
Level	Quantile
100% Max	266.590

99%	249.310
95%	210.230
90%	194.300
75% Q3	117.690
50% Median	91.870
25% Q1	76.930
10%	67.495
5%	64.400
1%	56.630
0% Min	56.420

Extreme Observations					
Lowest			Highest		
Value	**X2**	**Obs**	**Value**	**X2**	**Obs**
56.42	never_sm	232	216.07	never_sm	156
56.63	never_sm	189	228.20	never_sm	292
57.42	never_sm	282	237.74	never_sm	171
59.20	never_sm	284	249.31	never_sm	213
59.43	never_sm	183	266.59	never_sm	188


Distribution and Probability Plot for X3
X3 - avg_glucose_level
270
240
210
180
150
120
90
60
0
10
20
30
40
50
60
Count
X3 - avg_glucose_level
250
200
150
100
50
-3
-2
-1
0
1
2
3
Normal Quantiles

SAS Program-Homework

The UNIVARIATE Procedure
Variable: X3 (X3 - avg_glucose_level)

X2 - smoke_status=smokes

Moments			
N	150	Sum Weights	150
Mean	109.3728	Sum Observations	16405.92
Std Deviation	49.8697221	Variance	2486.98918
Skewness	1.46096649	Kurtosis	1.21333008
Uncorrected SS	2164922.79	Corrected SS	370561.388
Coeff Variation	45.5960916	Std Error Mean	4.07184576

Basic Statistical Measures			
Location		Variability	
Mean	109.3728	Std Deviation	49.86972
Median	93.5450	Variance	2487
Mode	60.7700	Range	199.63000
		Interquartile Range	46.91000

Note: The mode displayed is the smallest of 2 modes with a count of 2.

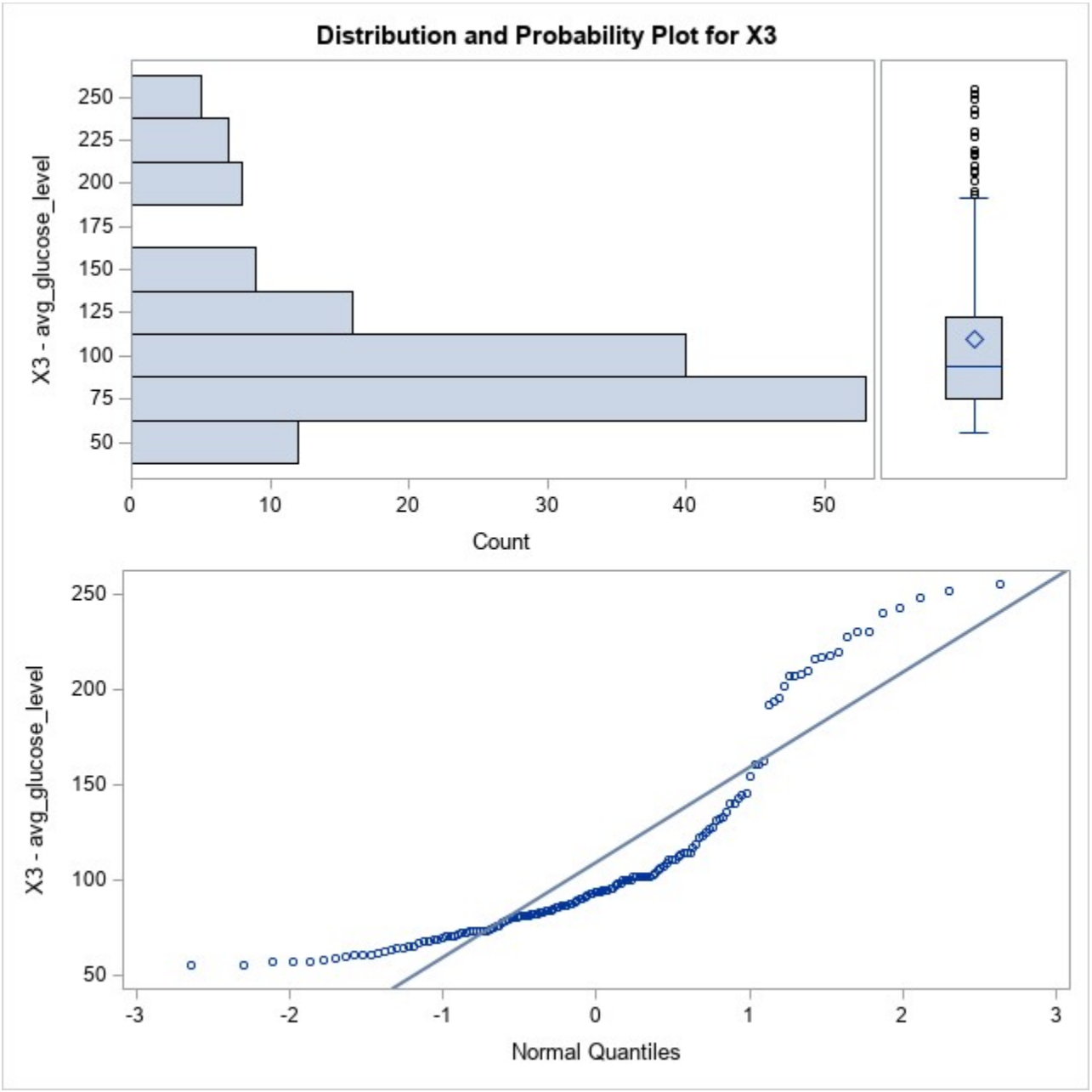
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	26.86074	Pr > |t|	<.0001
Sign	M	75	Pr >= |M|	<.0001
Signed Rank	S	5662.5	Pr >= |S|	<.0001

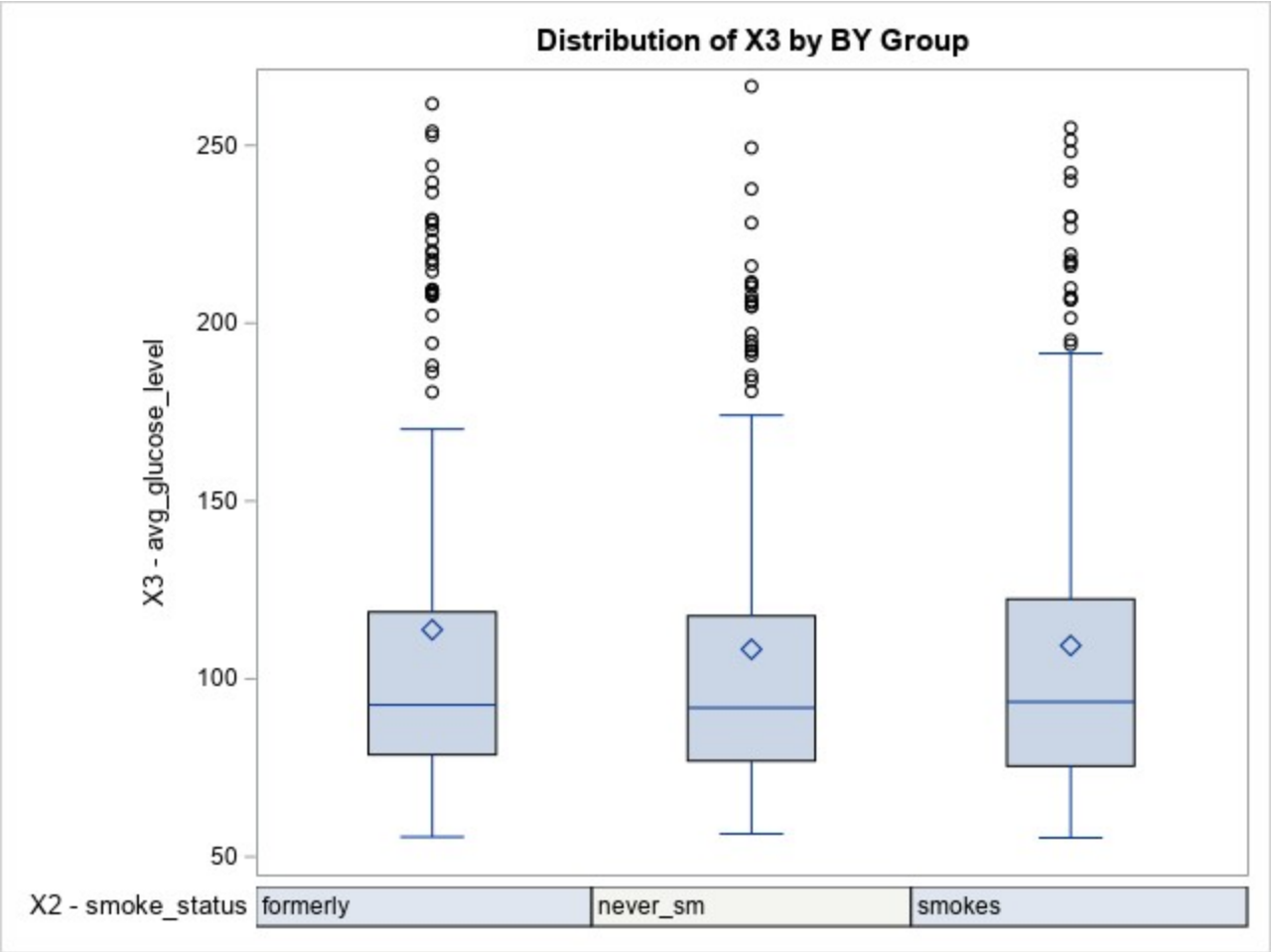
Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.812088	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.198696	Pr > D	<0.0100
Cramer-von Mises	W-Sq	1.746718	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	10.13822	Pr > A-Sq	<0.0050

Quantiles (Definition 5)

Level	Quantile
100% Max	254.950
99%	251.460
95%	226.930
90%	206.590
75% Q3	122.410
50% Median	93.545
25% Q1	75.500
10%	64.405
5%	60.060
1%	55.470
0% Min	55.320

Extreme Observations					
Lowest			Highest		
Value	X2	Obs	Value	X2	Obs
55.32	smokes	442	239.95	smokes	438
55.47	smokes	304	242.30	smokes	363
56.96	smokes	345	248.24	smokes	449
57.33	smokes	346	251.46	smokes	421
57.51	smokes	394	254.95	smokes	353


Distribution and Probability Plot for X3
X3 - avg_glucose_level
250
225
200
175
150
125
100
75
50
0
10
20
30
40
50
Count
X3 - avg_glucose_level
250
200
150
100
50
-3
-2
-1
0
1
2
3
Normal Quantiles


Distribution of X3 by BY Group
X3 - avg_glucose_level
250
200
150
100
50
X2 - smoke_status
formerly
never_sm
smokes

SAS Program-Homework

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
X1	3	Govt_job Private Self-emp

Number of Observations Read	450
Number of Observations Used	450

SAS Program-Homework

The GLM Procedure

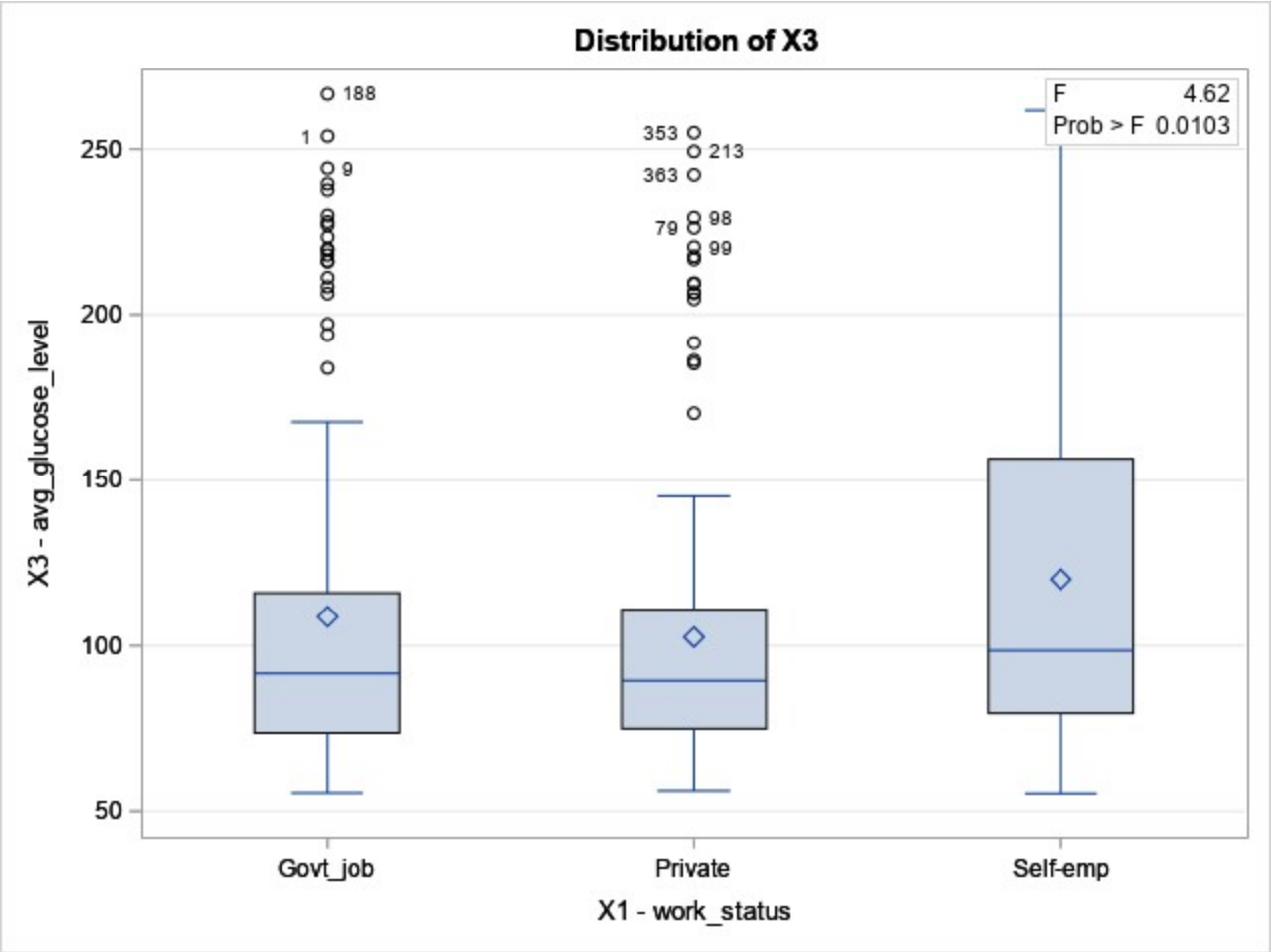
Dependent Variable: X3 X3 - avg_glucose_level

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	23581.332	11790.666	4.62	0.0103
Error	447	1140923.568	2552.402		
Corrected Total	449	1164504.900			

R-Square	Coeff Var	Root MSE	X3 Mean
0.020250	45.72133	50.52130	110.4983

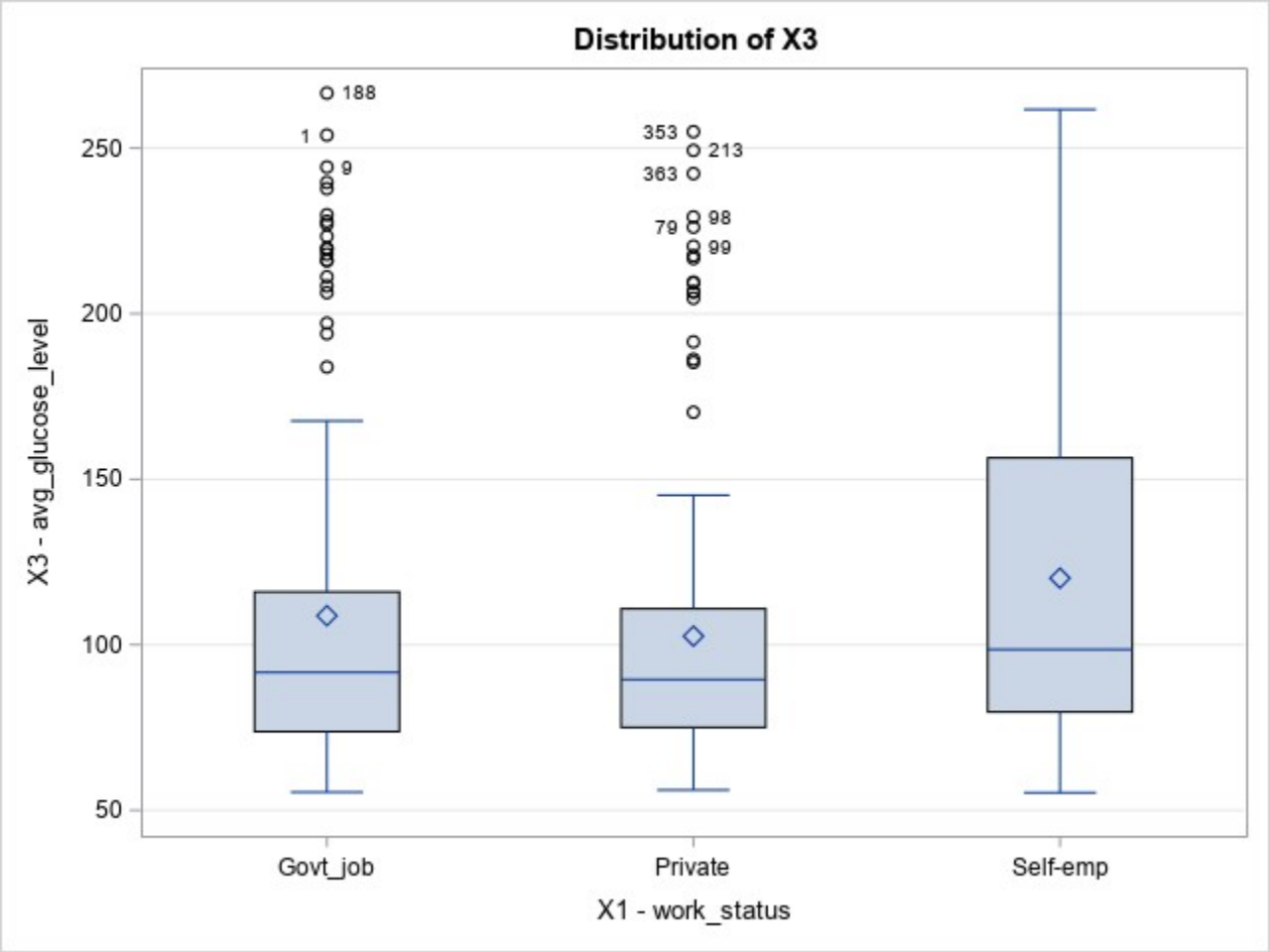
Source	DF	Type I SS	Mean Square	F Value	Pr > F
X1	2	23581.33184	11790.66592	4.62	0.0103

Source	DF	Type III SS	Mean Square	F Value	Pr > F
X1	2	23581.33184	11790.66592	4.62	0.0103


Distribution of X3
F 4.62
Prob > F 0.0103
188
1
9
353
213
363
79
98
99
250
200
150
100
50
X3 - avg_glucose_level
Govt_job
Private
Self-emp
X1 - work_status

SAS Program-Homework

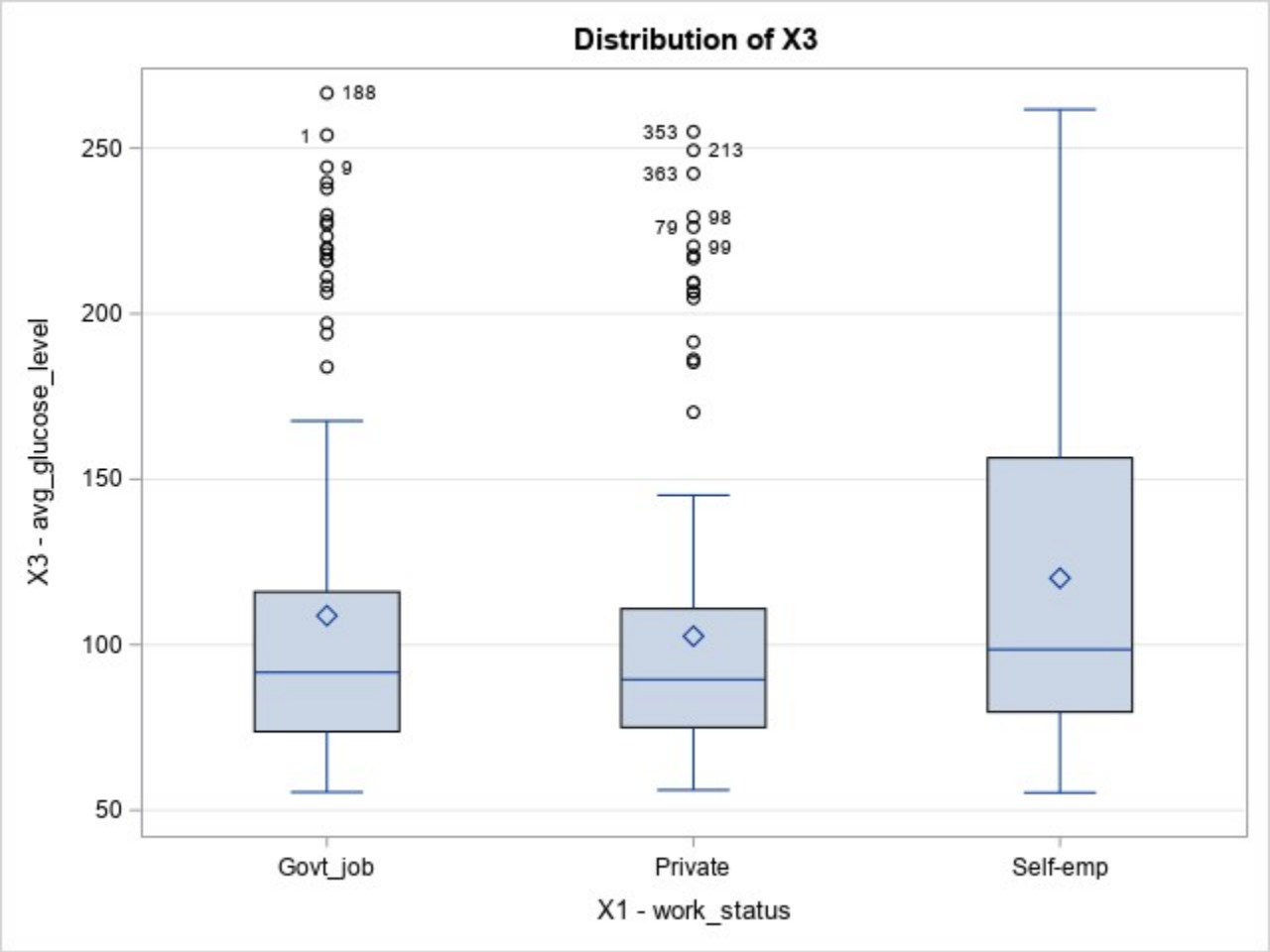
The GLM Procedure



Level of X1	N	X3	
		Mean	Std Dev
Govt_job	150	108.788133	50.7874567
Private	150	102.612067	44.7762171
Self-emp	150	120.094733	55.4340129

SAS Program-Homework

The GLM Procedure



SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	447
Error Mean Square	2552.402
Critical Value of t	1.96529
Least Significant Difference	11.465

Comparisons significant at the 0.05 level are indicated by *.**

X1 Comparison	Difference Between Means	95% Confidence Limits		
Self-emp - Govt_job	11.307	-0.158	22.771	
Self-emp - Private	17.483	6.018	28.948	***
Govt_job - Self-emp	-11.307	-22.771	0.158	
Govt_job - Private	6.176	-5.289	17.641	
Private - Self-emp	-17.483	-28.948	-6.018	***
Private - Govt_job	-6.176	-17.641	5.289	

SAS Program-Homework

The GLM Procedure

Bonferroni (Dunn) t Tests for X3

Note: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than Tukey's for all pairwise comparisons.

Alpha	0.05
Error Degrees of Freedom	447
Error Mean Square	2552.402
Critical Value of t	2.40302
Minimum Significant Difference	14.019

Comparisons significant at the 0.05 level are indicated by *.**

X1 Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
Self-emp - Govt_job	11.307	-2.712	25.325	
Self-emp - Private	17.483	3.464	31.501	***
Govt_job - Self-emp	-11.307	-25.325	2.712	
Govt_job - Private	6.176	-7.842	20.195	
Private - Self-emp	-17.483	-31.501	-3.464	***
Private - Govt_job	-6.176	-20.195	7.842	

SAS Program-Homework

The GLM Procedure

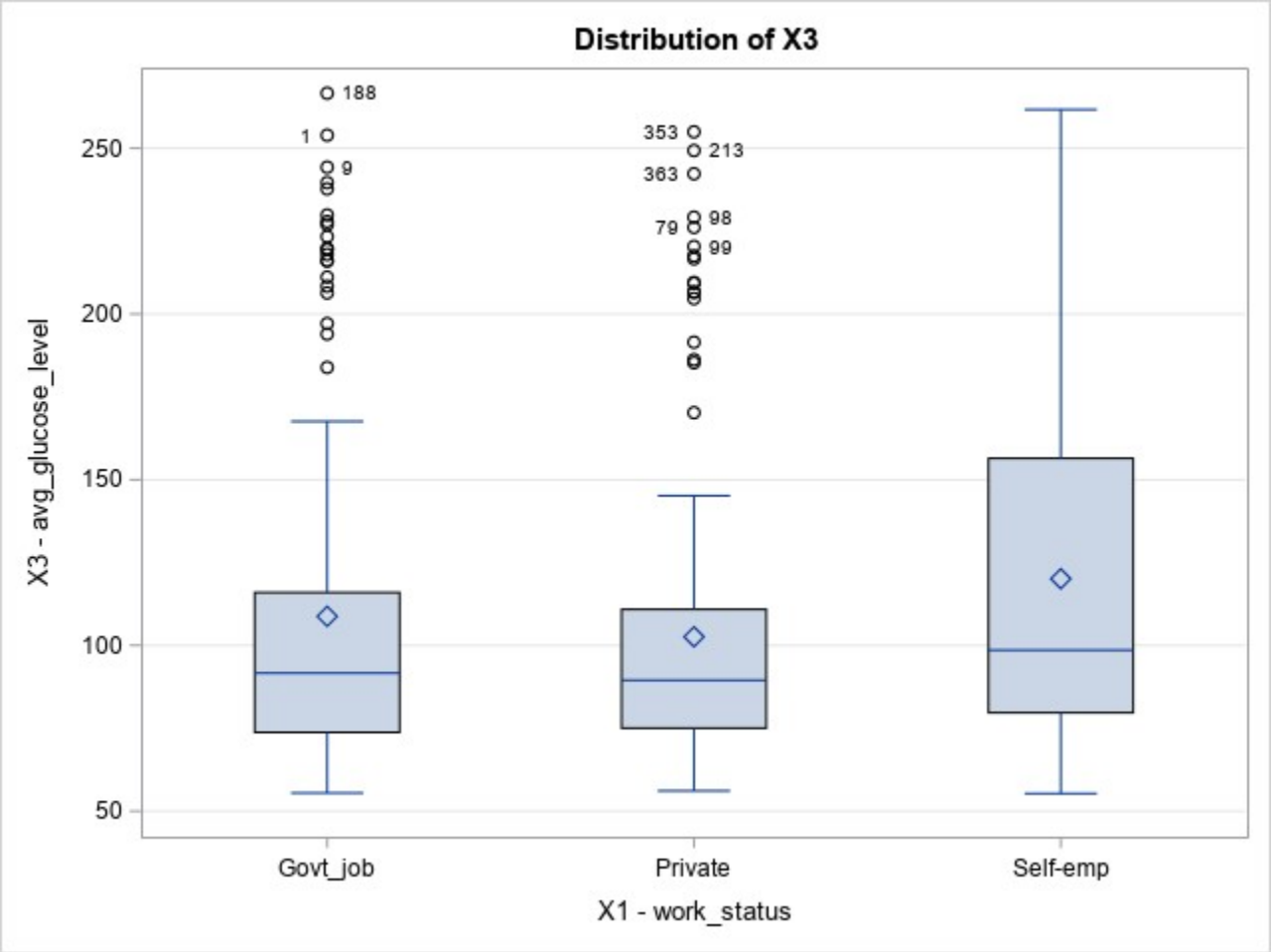
Levene's Test for Homogeneity of X3 Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
X1	2	84574581	42287290	2.35	0.0969
Error	447	8.0571E9	18024831		

Brown and Forsythe's Test for Homogeneity of X3 Variance ANOVA of Absolute Deviations from Group Medians					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
X1	2	12874.7	6437.4	4.00	0.0190
Error	447	720034	1610.8		

Bartlett's Test for Homogeneity of X3 Variance			
Source	DF	Chi-Square	Pr > ChiSq
X1	2	6.7341	0.0345

SAS Program-Homework

The GLM Procedure



Level of X1	N	X3	
		Mean	Std Dev
Govt_job	150	108.788133	50.7874567
Private	150	102.612067	44.7762171
Self-emp	150	120.094733	55.4340129

SAS Program-Homework

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
X2	3	formerly never_sm smokes

Number of Observations Read	450
Number of Observations Used	450

SAS Program-Homework

The GLM Procedure

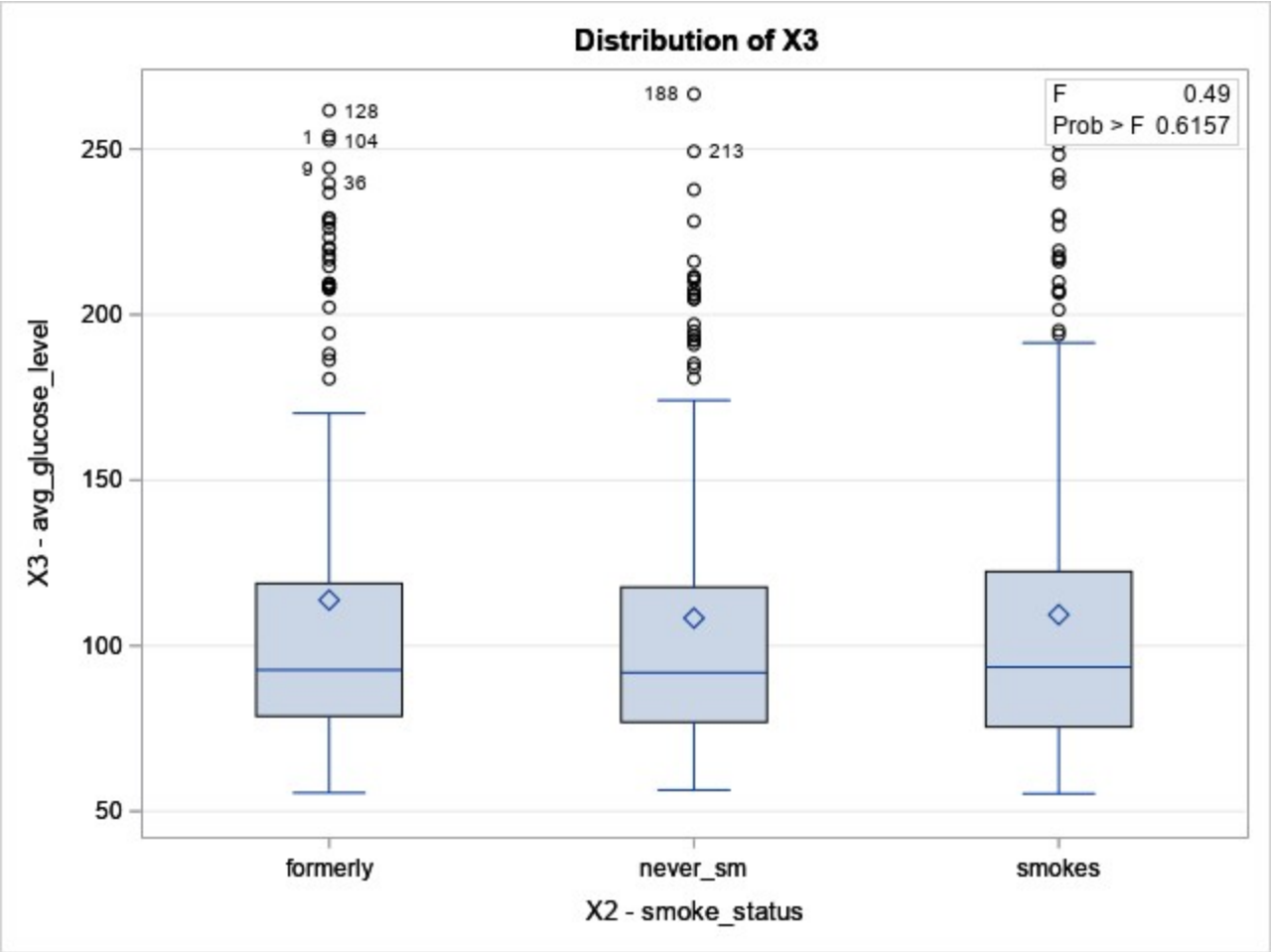
Dependent Variable: X3 X3 - avg_glucose_level

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2524.281	1262.140	0.49	0.6157
Error	447	1161980.619	2599.509		
Corrected Total	449	1164504.900			

R-Square	Coeff Var	Root MSE	X3 Mean
0.002168	46.14132	50.98538	110.4983

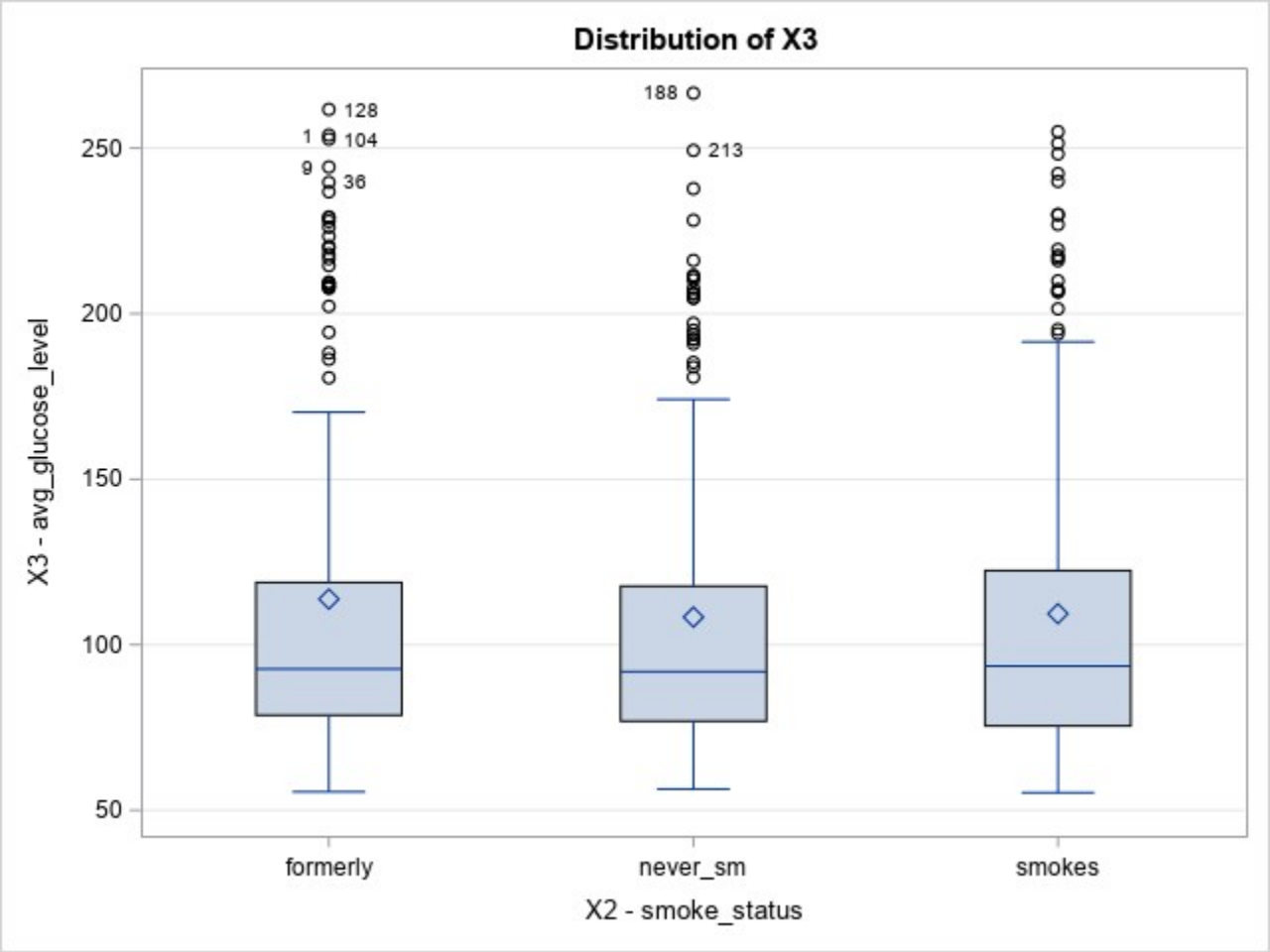
Source	DF	Type I SS	Mean Square	F Value	Pr > F
X2	2	2524.280915	1262.140458	0.49	0.6157

Source	DF	Type III SS	Mean Square	F Value	Pr > F
X2	2	2524.280915	1262.140458	0.49	0.6157


Distribution of X3
F 0.49
Prob > F 0.6157
128
104
36
188
213
250
200
150
100
50
X3 - avg_glucose_level
formerly
never_sm
smokes
X2 - smoke_status

SAS Program-Homework

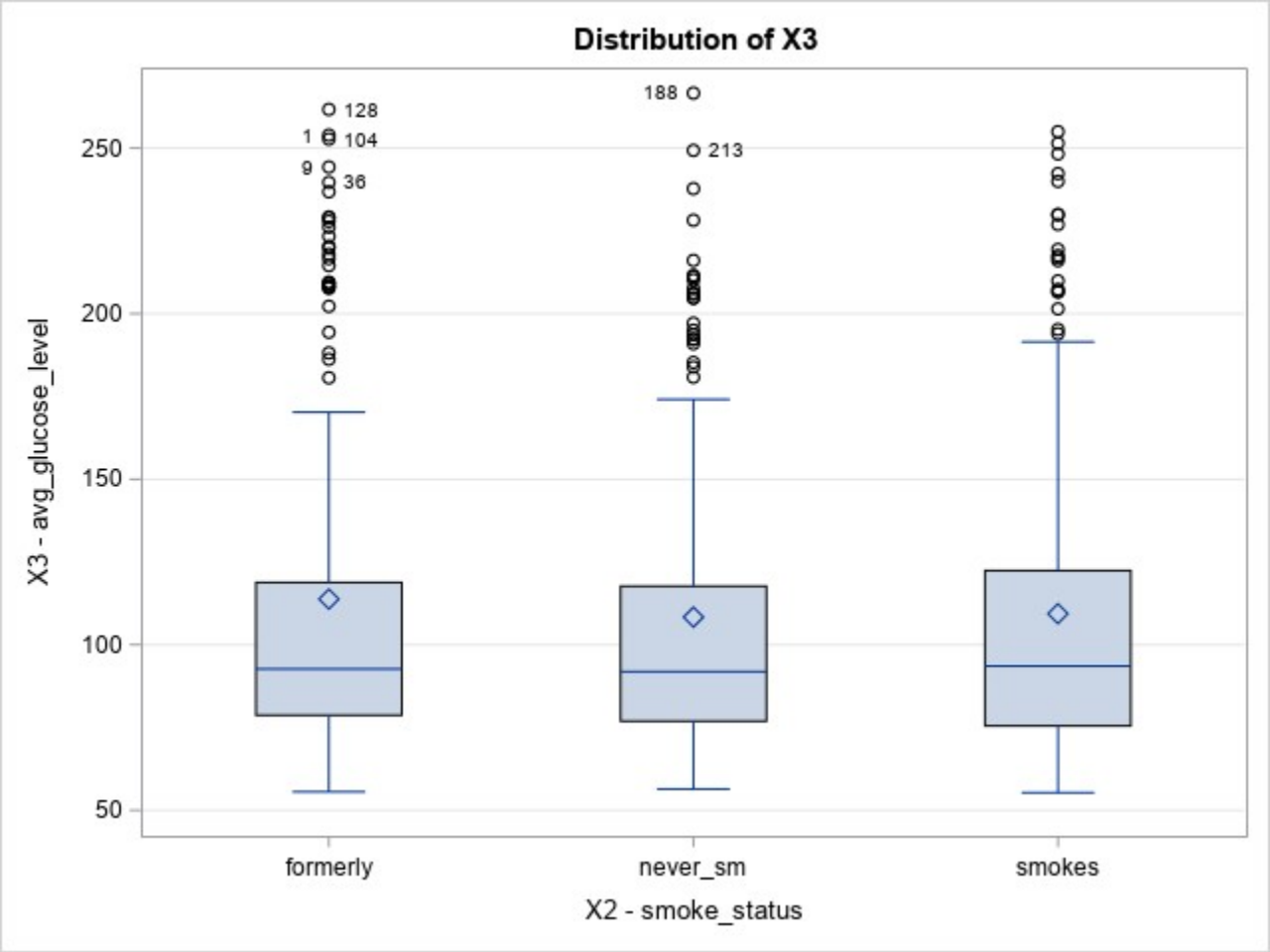
The GLM Procedure



Level of X2	N	X3	
		Mean	Std Dev
formerly	150	113.793133	55.6267511
never_sm	150	108.329000	47.0871853
smokes	150	109.372800	49.8697221

SAS Program-Homework

The GLM Procedure



SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	447
Error Mean Square	2599.509
Critical Value of t	1.96529
Least Significant Difference	11.57

Comparisons significant at the 0.05 level are indicated by *.**

X2 Comparison	Difference Between Means	95% Confidence Limits		
formerly - smokes	4.420	-7.150	15.991	
formerly - never_sm	5.464	-6.106	17.034	
smokes - formerly	-4.420	-15.991	7.150	
smokes - never_sm	1.044	-10.526	12.614	
never_sm - formerly	-5.464	-17.034	6.106	
never_sm - smokes	-1.044	-12.614	10.526	

SAS Program-Homework

The GLM Procedure

Bonferroni (Dunn) t Tests for X3

Note: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than Tukey's for all pairwise comparisons.

Alpha	0.05
Error Degrees of Freedom	447
Error Mean Square	2599.509
Critical Value of t	2.40302
Minimum Significant Difference	14.147

Comparisons significant at the 0.05 level are indicated by *.**

X2 Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
formerly - smokes	4.420	-9.727	18.568	
formerly - never_sm	5.464	-8.683	19.611	
smokes - formerly	-4.420	-18.568	9.727	
smokes - never_sm	1.044	-13.103	15.191	
never_sm - formerly	-5.464	-19.611	8.683	
never_sm - smokes	-1.044	-15.191	13.103	

SAS Program-Homework

The GLM Procedure

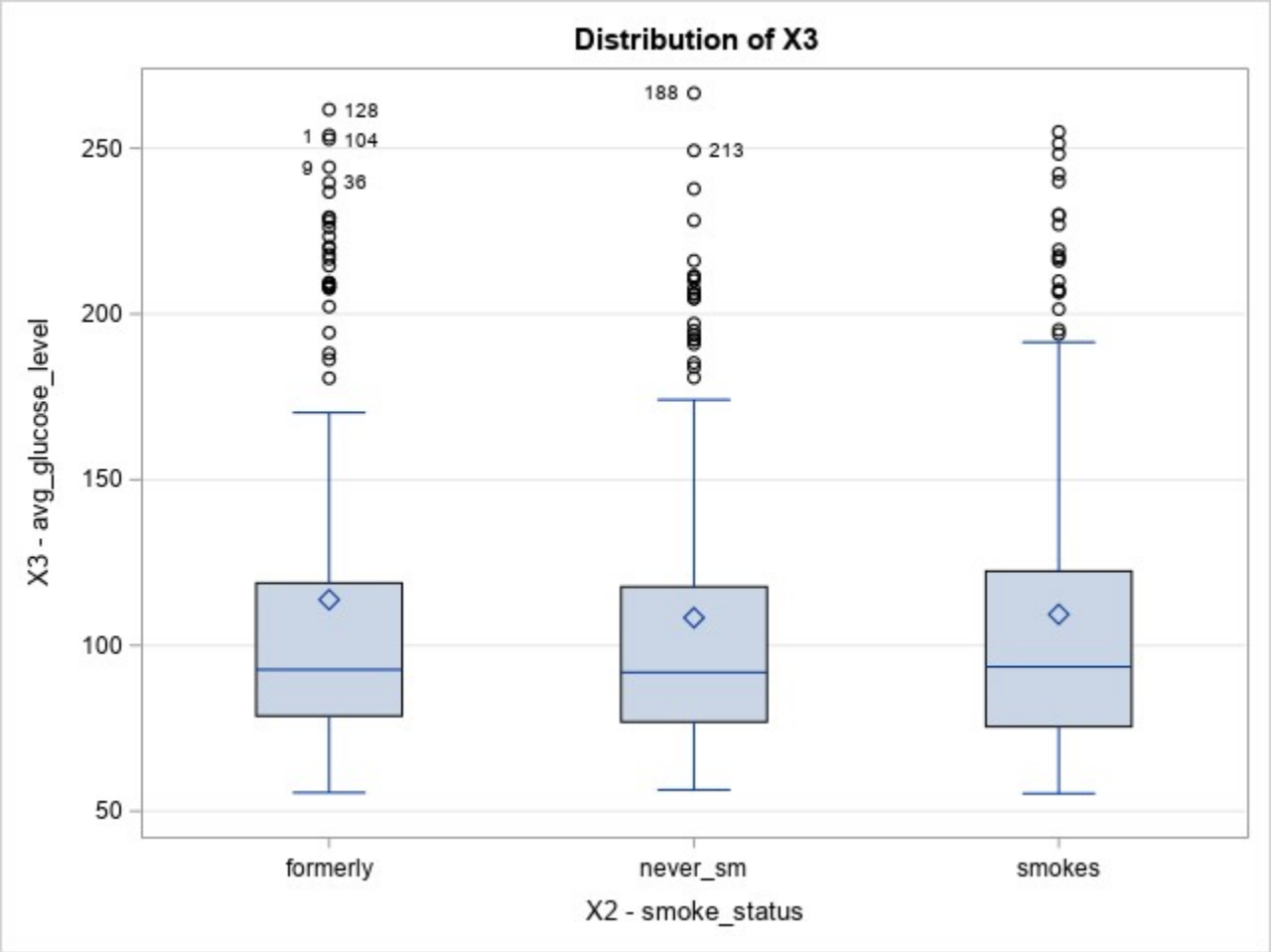
Levene's Test for Homogeneity of X3 Variance ANOVA of Squared Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
X2	2	59746114	29873057	1.63	0.1973
Error	447	8.1971E9	18338006		

Brown and Forsythe's Test for Homogeneity of X3 Variance ANOVA of Absolute Deviations from Group Medians					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
X2	2	3812.9	1906.4	1.13	0.3224
Error	447	750949	1680.0		

Bartlett's Test for Homogeneity of X3 Variance			
Source	DF	Chi-Square	Pr > ChiSq
X2	2	4.3194	0.1154

SAS Program-Homework

The GLM Procedure



Level of X2	N	X3	
		Mean	Std Dev
formerly	150	113.793133	55.6267511
never_sm	150	108.329000	47.0871853
smokes	150	109.372800	49.8697221

SAS Program-Homework

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
X1	3	Govt_job Private Self-emp
X2	3	formerly never_sm smokes

Number of Observations Read	450
Number of Observations Used	450

SAS Program-Homework

The GLM Procedure

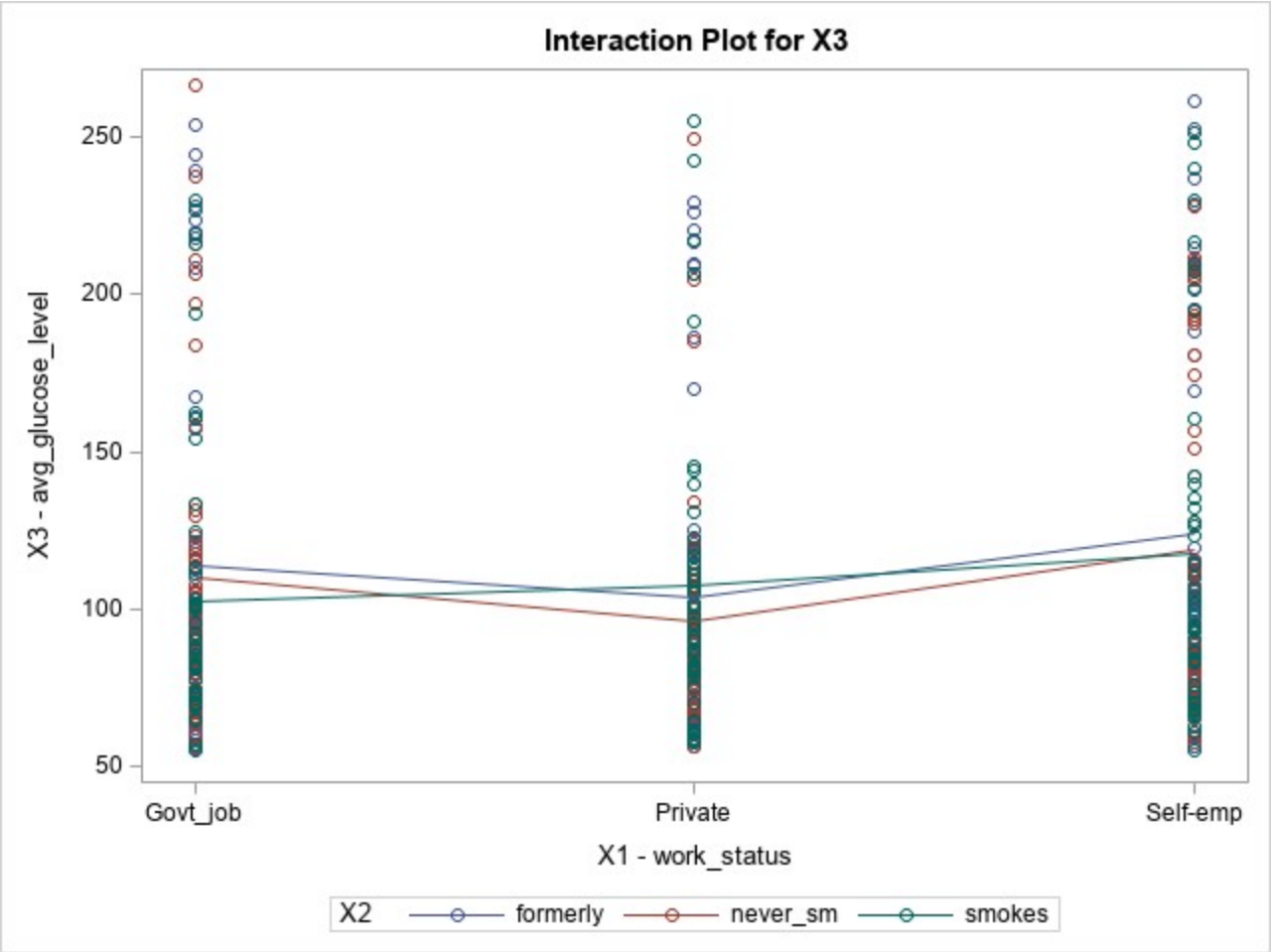
Dependent Variable: X3 X3 - avg_glucose_level

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	31452.135	3931.517	1.53	0.1444
Error	441	1133052.765	2569.281		
Corrected Total	449	1164504.900			

R-Square	Coeff Var	Root MSE	X3 Mean
0.027009	45.87226	50.68807	110.4983

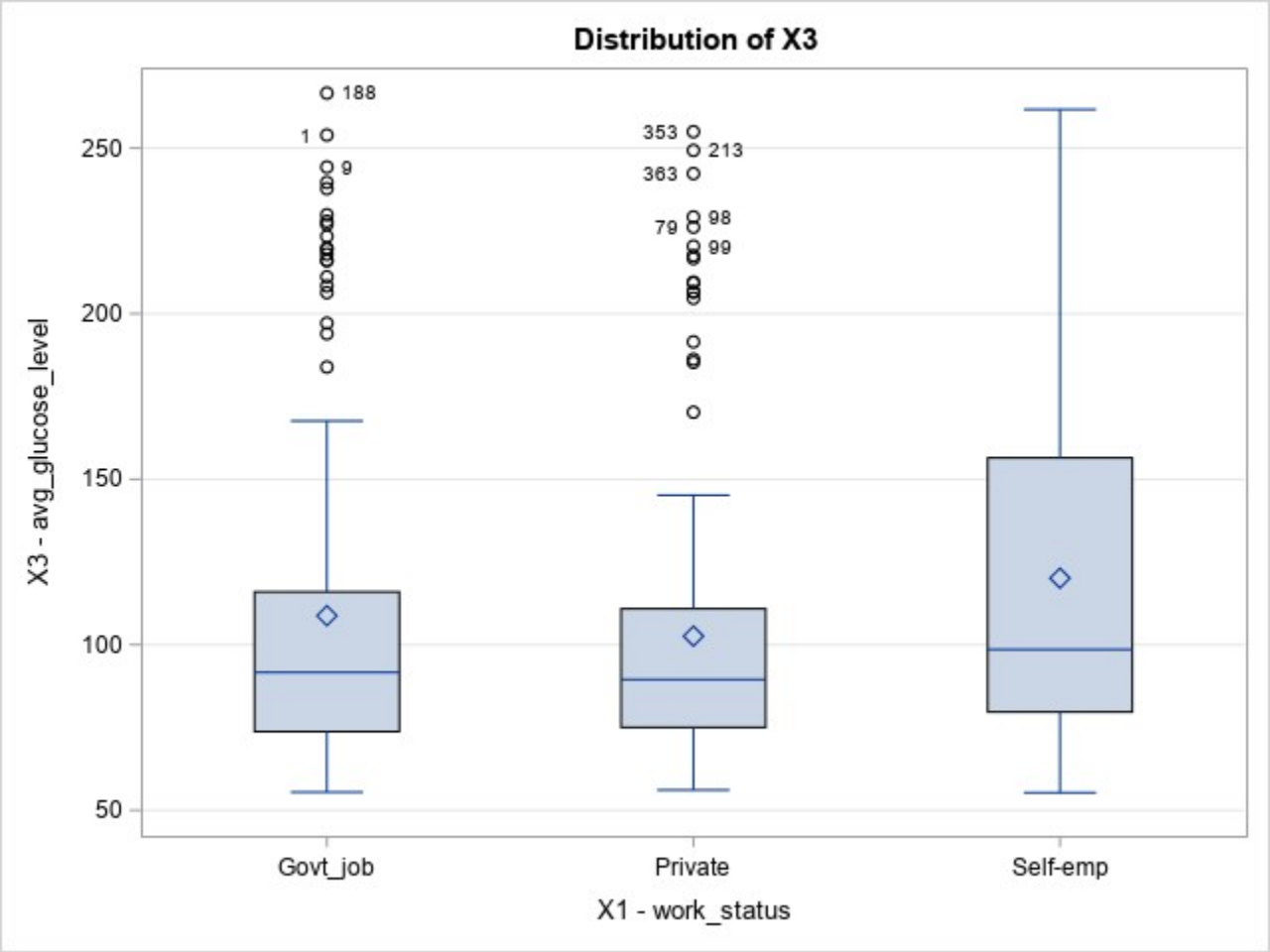
Source	DF	Type I SS	Mean Square	F Value	Pr > F
X1	2	23581.33184	11790.66592	4.59	0.0107
X2	2	2524.28092	1262.14046	0.49	0.6122
X1*X2	4	5346.52204	1336.63051	0.52	0.7209

Source	DF	Type III SS	Mean Square	F Value	Pr > F
X1	2	23581.33184	11790.66592	4.59	0.0107
X2	2	2524.28092	1262.14046	0.49	0.6122
X1*X2	4	5346.52204	1336.63051	0.52	0.7209


Interaction Plot for X3
X3 - avg_glucose_level
250
200
150
100
50
Govt_job
Private
Self-emp
X1 - work_status
X2
formerly
never_sm
smokes

SAS Program-Homework

The GLM Procedure



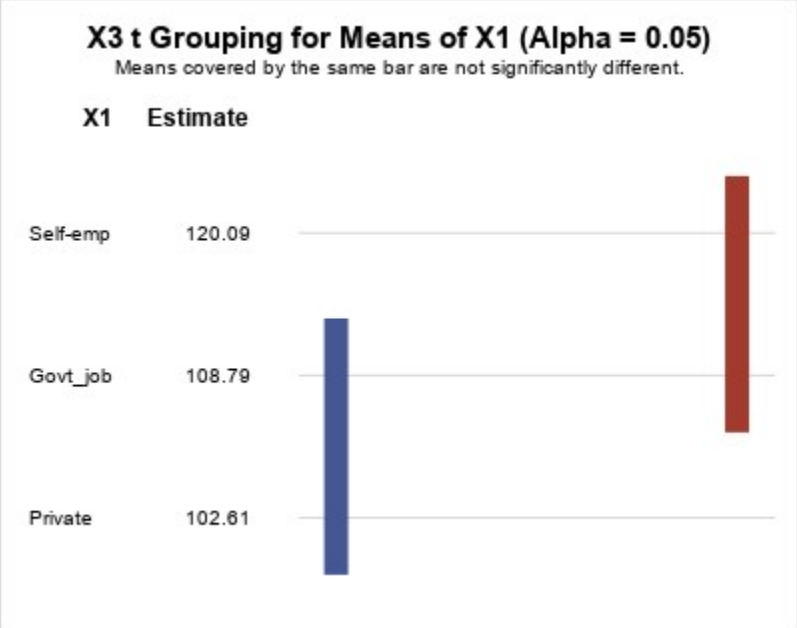
SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	441
Error Mean Square	2569.281
Critical Value of t	1.96536
Least Significant Difference	11.503



SAS Program-Homework

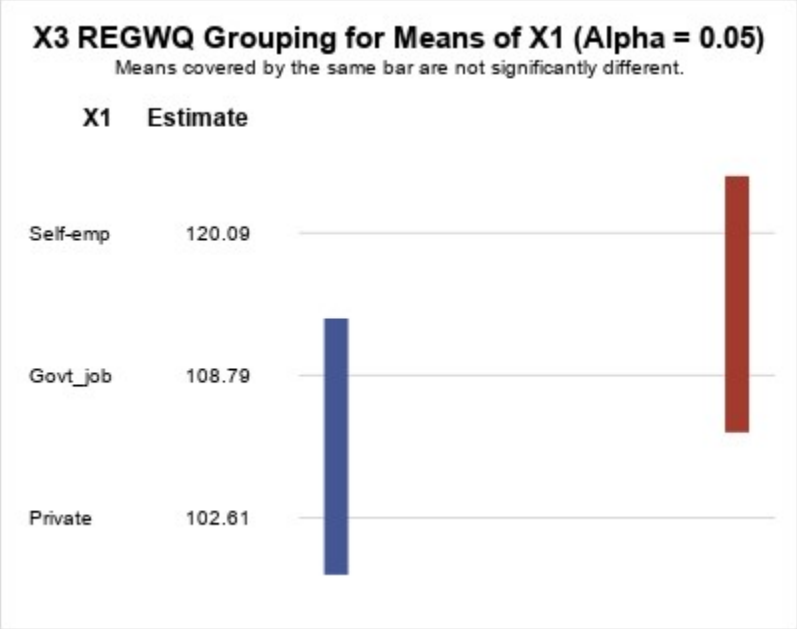
The GLM Procedure

Ryan-Einot-Gabriel-Welsch Multiple Range Test for X3

Note: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	441
Error Mean Square	2569.281

Number of Means	**2**	**3**
Critical Range	11.503151	13.764119



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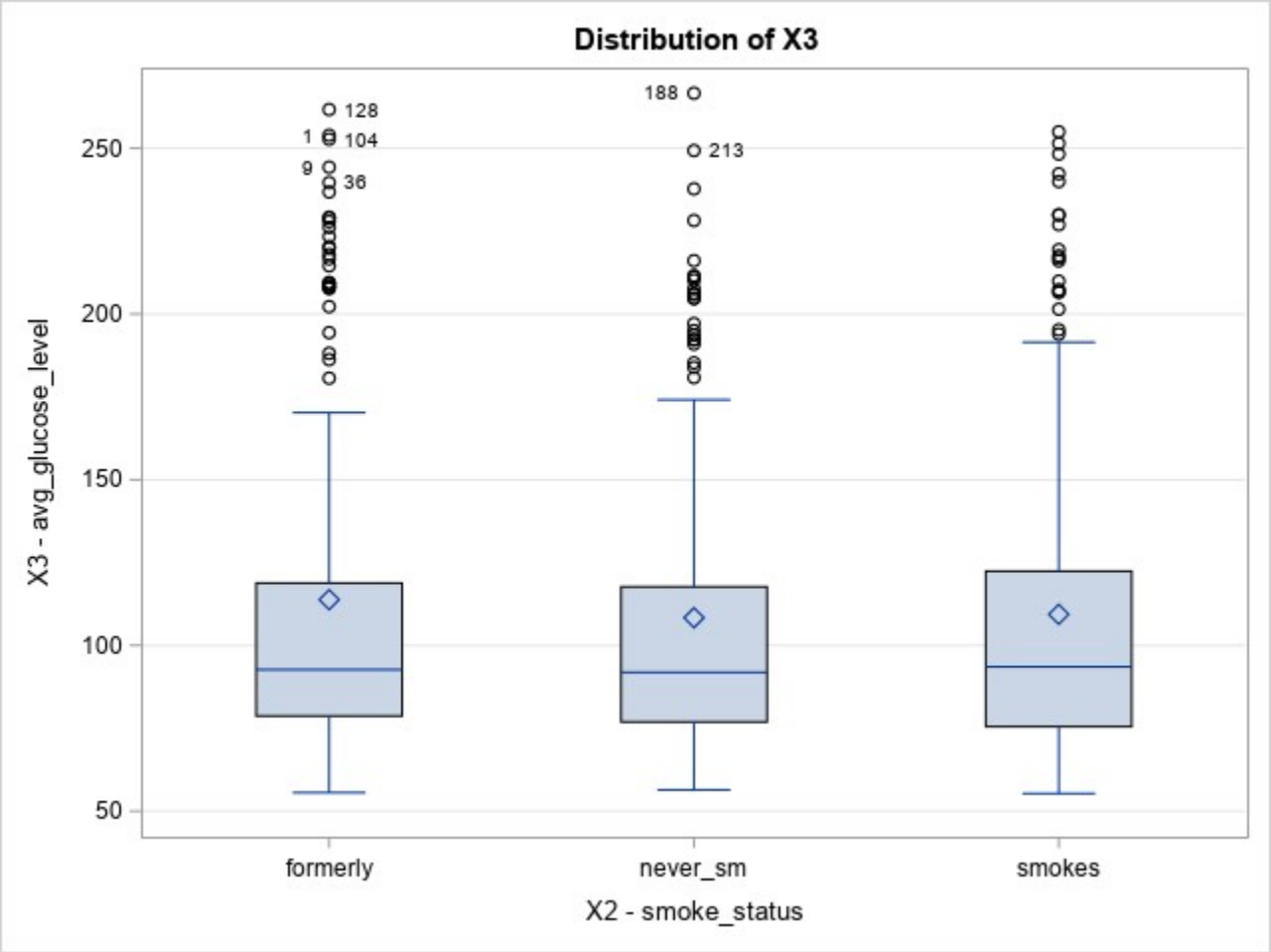
The GLM Procedure



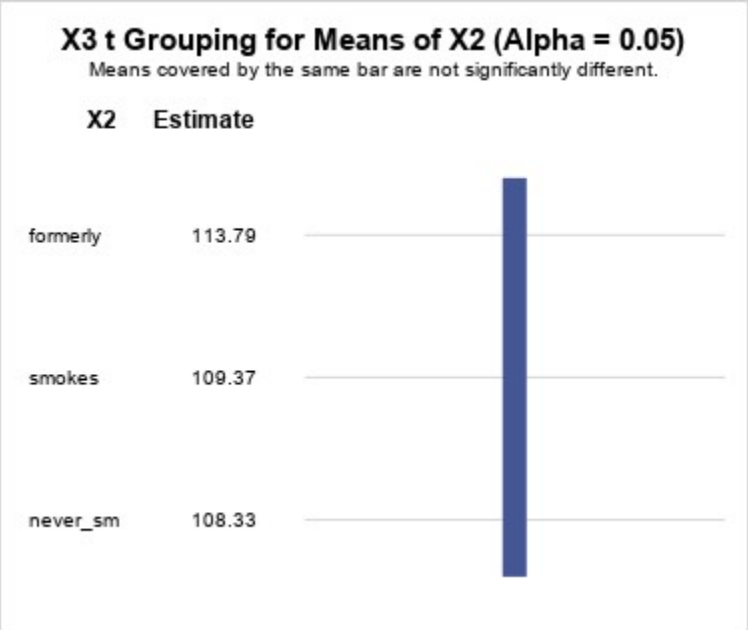
SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	441
Error Mean Square	2569.281
Critical Value of t	1.96536
Least Significant Difference	11.503



SAS Program-Homework

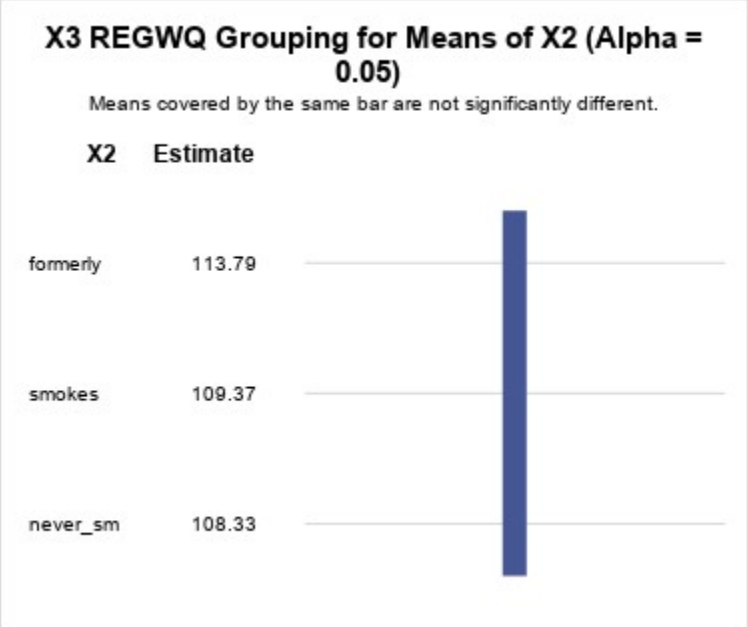
The GLM Procedure

Ryan-Einot-Gabriel-Welsch Multiple Range Test for X3

Note: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	441
Error Mean Square	2569.281

Number of Means	**2**	**3**
Critical Range	11.503151	13.764119



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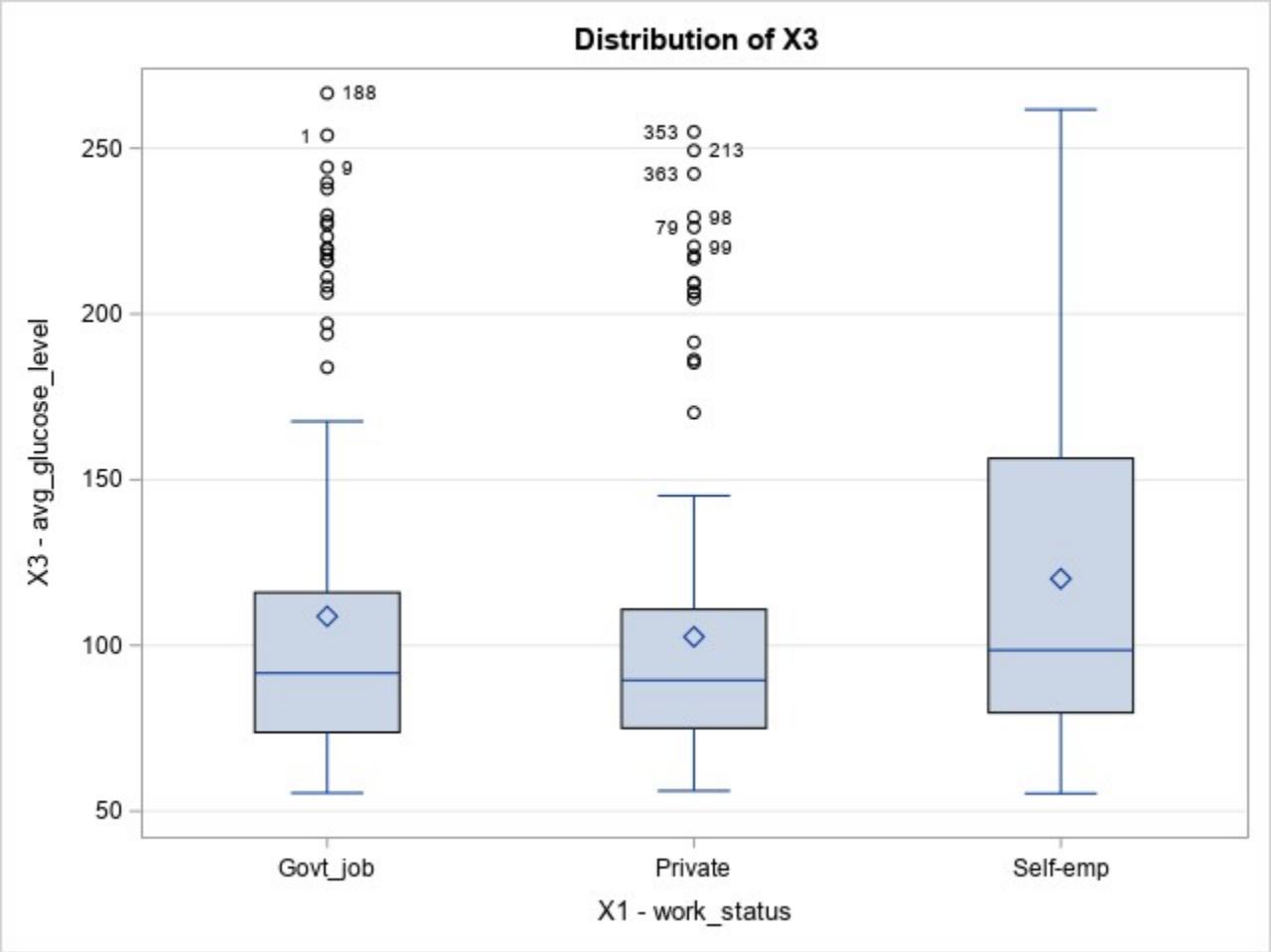
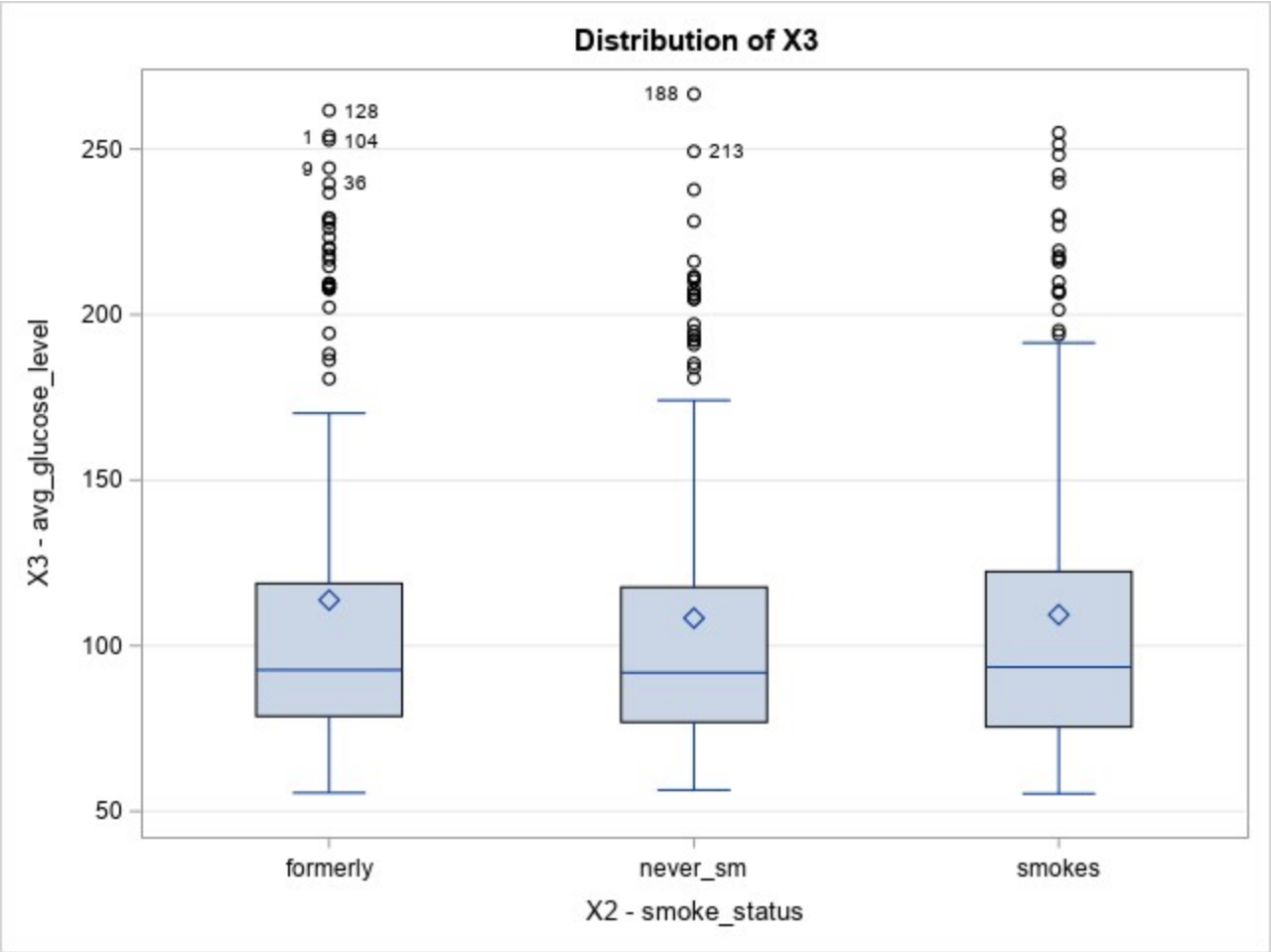
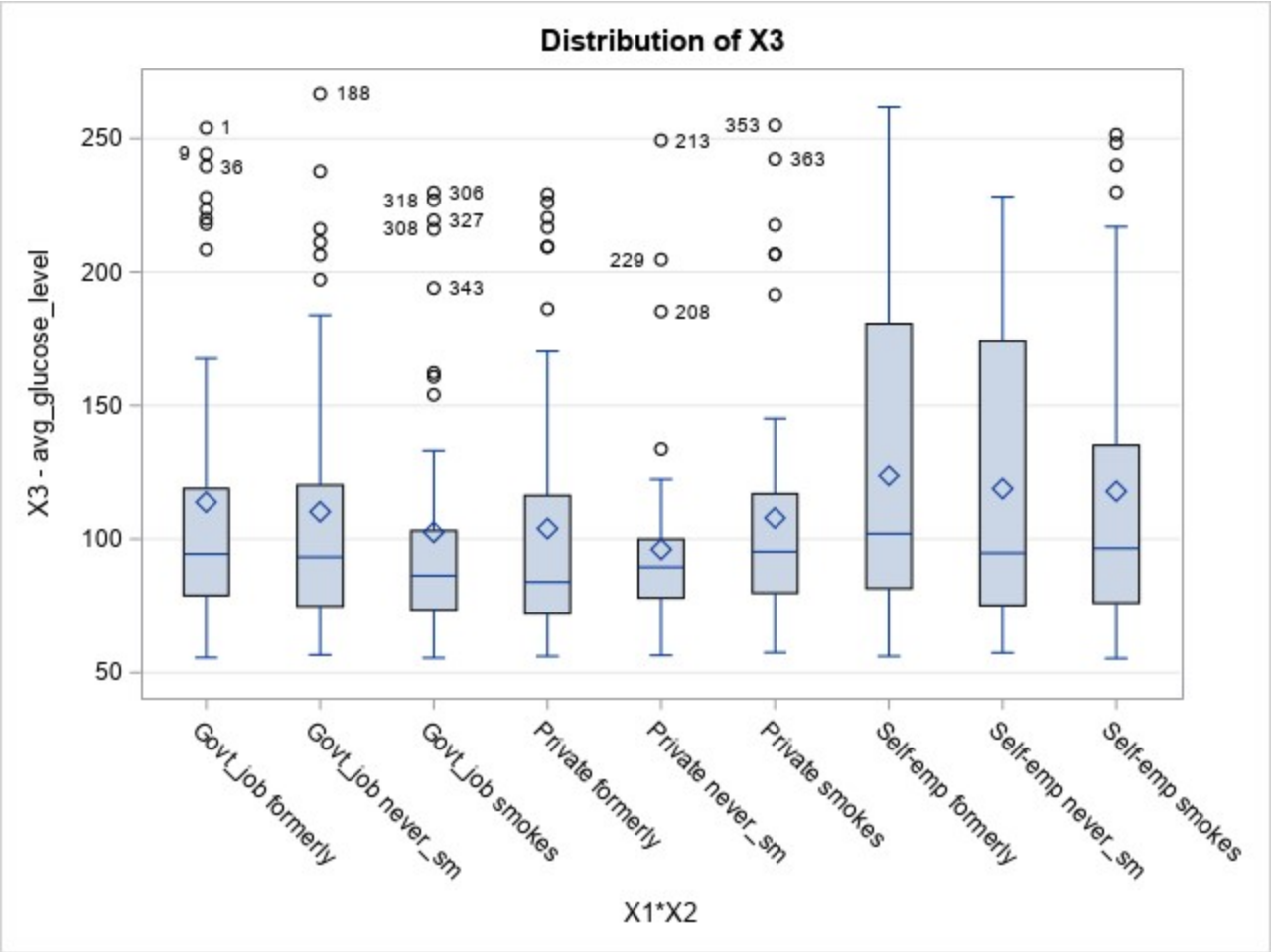
The GLM Procedure



Level of X1	N	X3	
		Mean	Std Dev
Govt_job	150	108.788133	50.7874567
Private	150	102.612067	44.7762171
Self-emp	150	120.094733	55.4340129



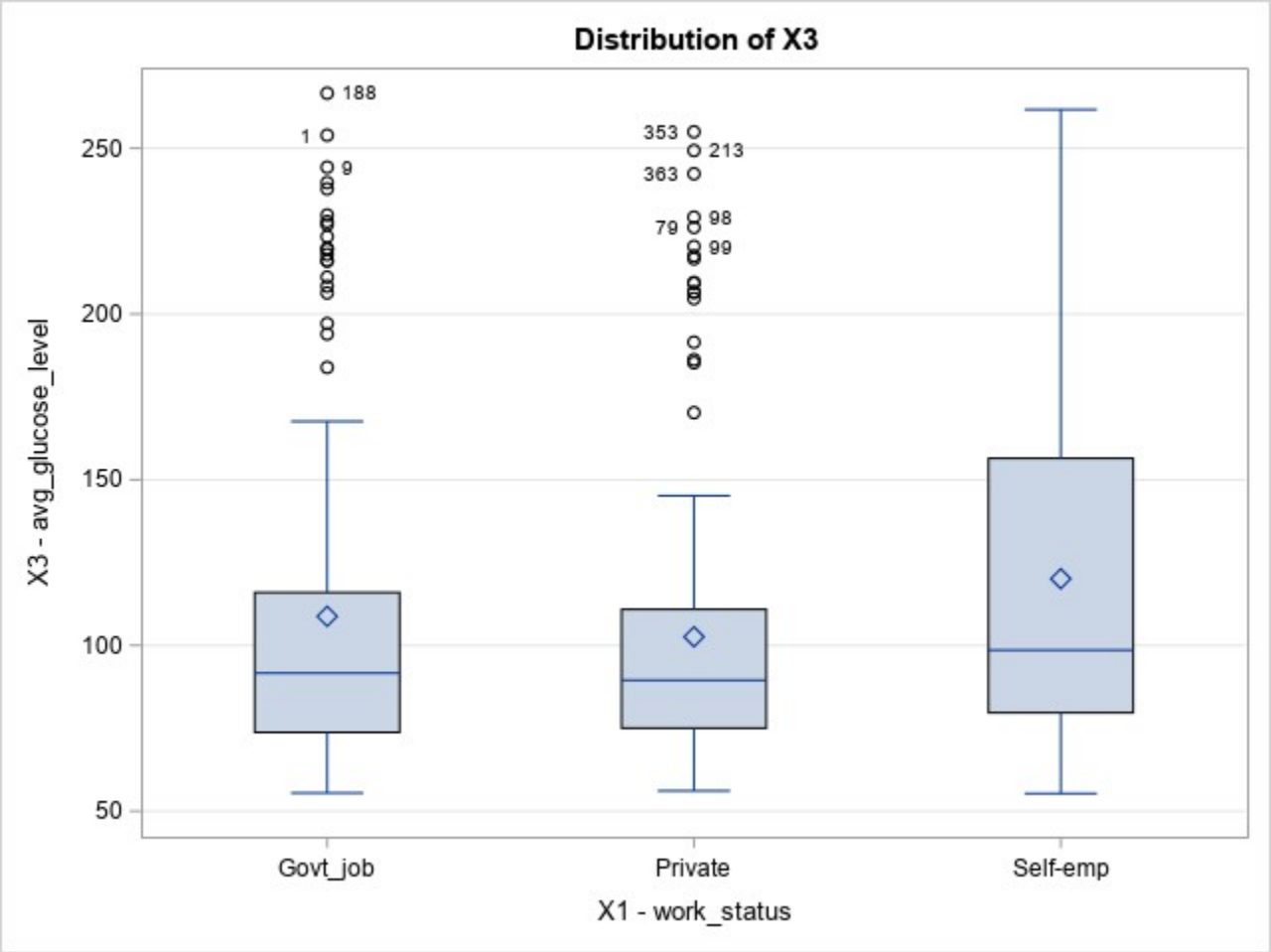
Level of X2	N	X3	
		Mean	Std Dev
formerly	150	113.793133	55.6267511
never_sm	150	108.329000	47.0871853
smokes	150	109.372800	49.8697221



Level of X1	Level of X2	N	X3	
			Mean	Std Dev
Govt_job	formerly	50	113.723200	56.9170495
Govt_job	never_sm	50	110.125600	49.5485861
Govt_job	smokes	50	102.515600	45.6282775
Private	formerly	50	103.893000	50.1207868
Private	never_sm	50	96.106800	34.7241297
Private	smokes	50	107.836400	48.0207909
Self-emp	formerly	50	123.763200	58.7895670
Self-emp	never_sm	50	118.754600	53.0532166
Self-emp	smokes	50	117.766400	55.2472751

SAS Program-Homework

The GLM Procedure



SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	441
Error Mean Square	2569.281
Critical Value of t	1.96536
Least Significant Difference	11.503

Comparisons significant at the 0.05 level are indicated by *.**

X1 Comparison	Difference Between Means	95% Confidence Limits		
Self-emp - Govt_job	11.307	-0.197	22.810	
Self-emp - Private	17.483	5.980	28.986	***
Govt_job - Self-emp	-11.307	-22.810	0.197	
Govt_job - Private	6.176	-5.327	17.679	
Private - Self-emp	-17.483	-28.986	-5.980	***
Private - Govt_job	-6.176	-17.679	5.327	

SAS Program-Homework

The GLM Procedure

Bonferroni (Dunn) t Tests for X3

Note: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than Tukey's for all pairwise comparisons.

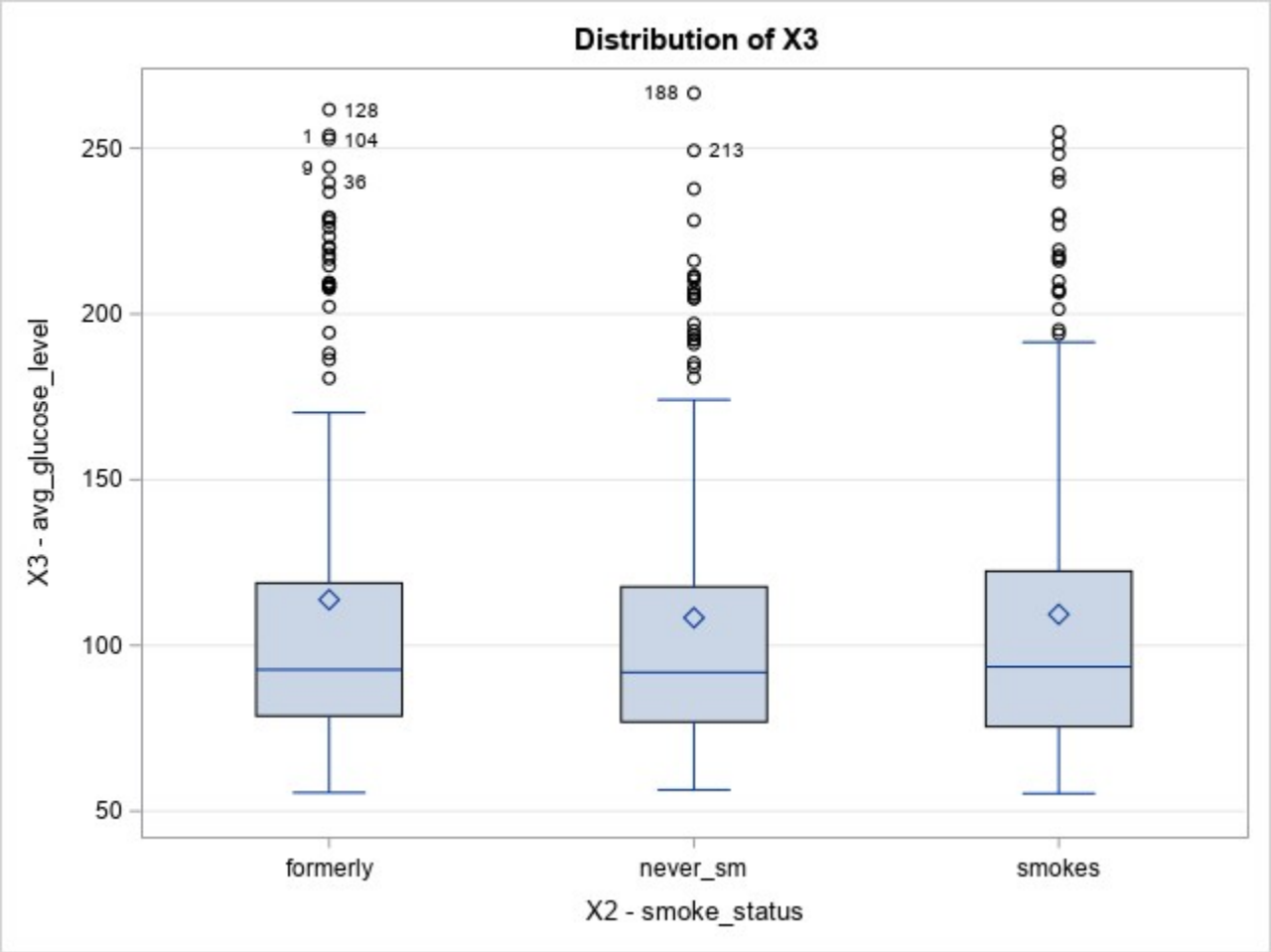
Alpha	0.05
Error Degrees of Freedom	441
Error Mean Square	2569.281
Critical Value of t	2.40315
Minimum Significant Difference	14.066

Comparisons significant at the 0.05 level are indicated by *.**

X1 Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
Self-emp - Govt_job	11.307	-2.759	25.372	
Self-emp - Private	17.483	3.417	31.548	***
Govt_job - Self-emp	-11.307	-25.372	2.759	
Govt_job - Private	6.176	-7.889	20.242	
Private - Self-emp	-17.483	-31.548	-3.417	***
Private - Govt_job	-6.176	-20.242	7.889	

SAS Program-Homework

The GLM Procedure



SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	441
Error Mean Square	2569.281
Critical Value of t	1.96536
Least Significant Difference	11.503

Comparisons significant at the 0.05 level are indicated by *.**

X2 Comparison	Difference Between Means	95% Confidence Limits		
formerly - smokes	4.420	-7.083	15.923	
formerly - never_sm	5.464	-6.039	16.967	
smokes - formerly	-4.420	-15.923	7.083	
smokes - never_sm	1.044	-10.459	12.547	
never_sm - formerly	-5.464	-16.967	6.039	
never_sm - smokes	-1.044	-12.547	10.459	

SAS Program-Homework

The GLM Procedure

Bonferroni (Dunn) t Tests for X3

Note: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than Tukey's for all pairwise comparisons.

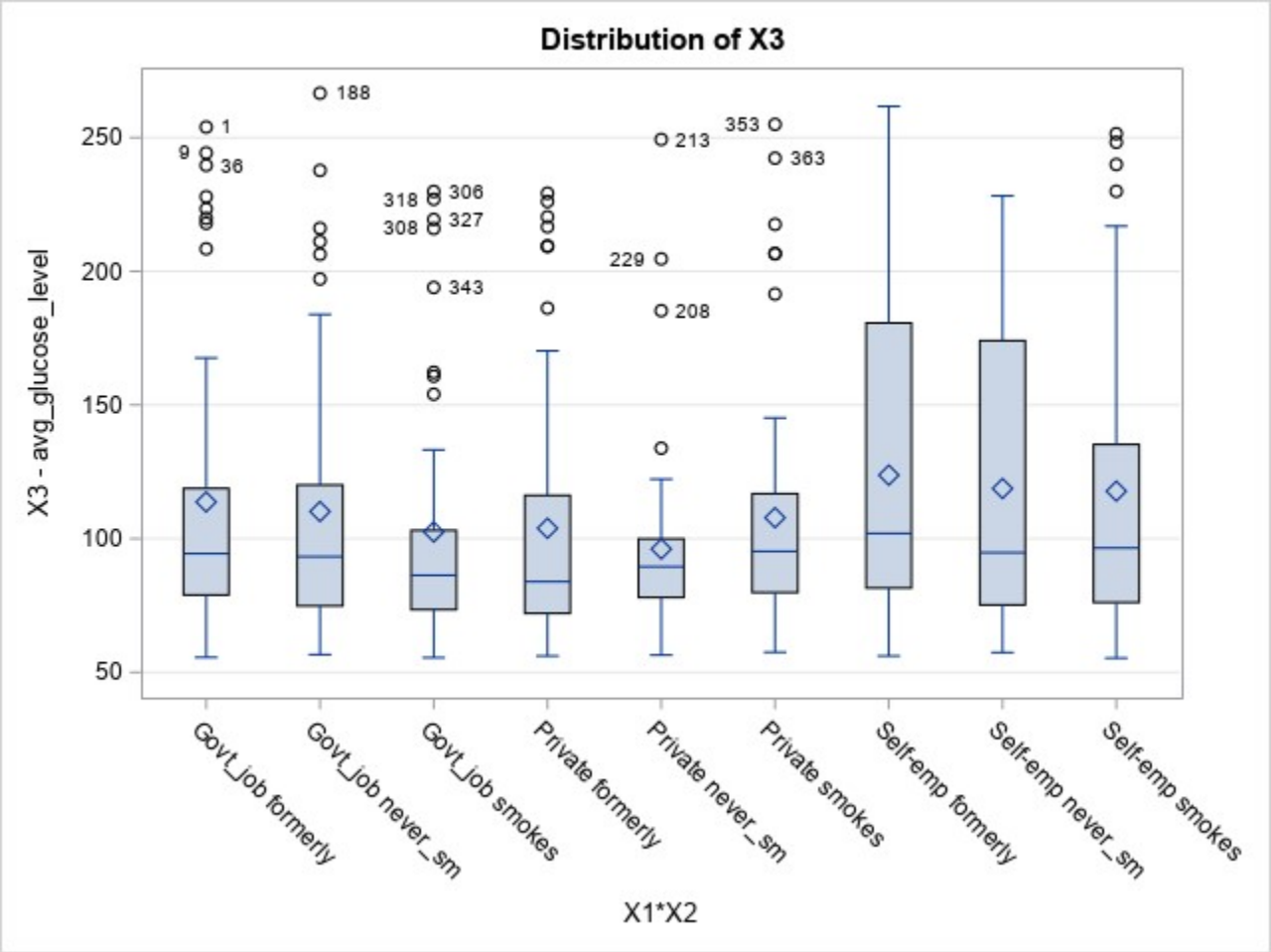
Alpha	0.05
Error Degrees of Freedom	441
Error Mean Square	2569.281
Critical Value of t	2.40315
Minimum Significant Difference	14.066

Comparisons significant at the 0.05 level are indicated by *.**

X2 Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
formerly - smokes	4.420	-9.645	18.486	
formerly - never_sm	5.464	-8.601	19.530	
smokes - formerly	-4.420	-18.486	9.645	
smokes - never_sm	1.044	-13.022	15.109	
never_sm - formerly	-5.464	-19.530	8.601	
never_sm - smokes	-1.044	-15.109	13.022	

SAS Program-Homework

The GLM Procedure



Level of X1	Level of X2	N	X3	
			Mean	Std Dev
Govt_job	formerly	50	113.723200	56.9170495
Govt_job	never_sm	50	110.125600	49.5485861
Govt_job	smokes	50	102.515600	45.6282775
Private	formerly	50	103.893000	50.1207868
Private	never_sm	50	96.106800	34.7241297
Private	smokes	50	107.836400	48.0207909
Self-emp	formerly	50	123.763200	58.7895670
Self-emp	never_sm	50	118.754600	53.0532166
Self-emp	smokes	50	117.766400	55.2472751

SAS Program-Homework

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
X1	3	Govt_job Private Self-emp
X2	3	formerly never_sm smokes

Number of Observations Read	450
Number of Observations Used	450

SAS Program-Homework

The GLM Procedure

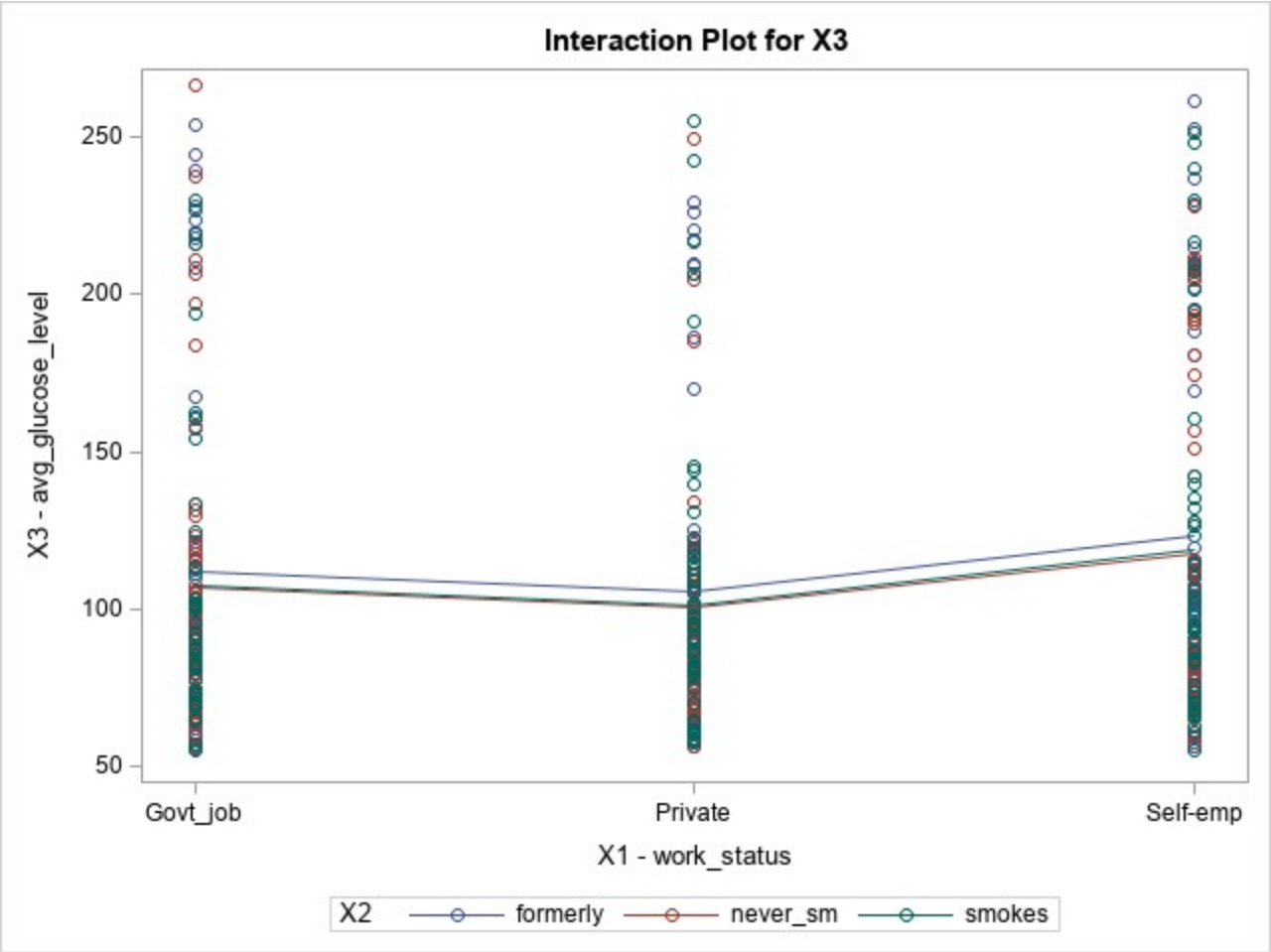
Dependent Variable: X3 X3 - avg_glucose_level

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	26105.613	6526.403	2.55	0.0386
Error	445	1138399.287	2558.201		
Corrected Total	449	1164504.900			

R-Square	Coeff Var	Root MSE	X3 Mean
0.022418	45.77324	50.57866	110.4983

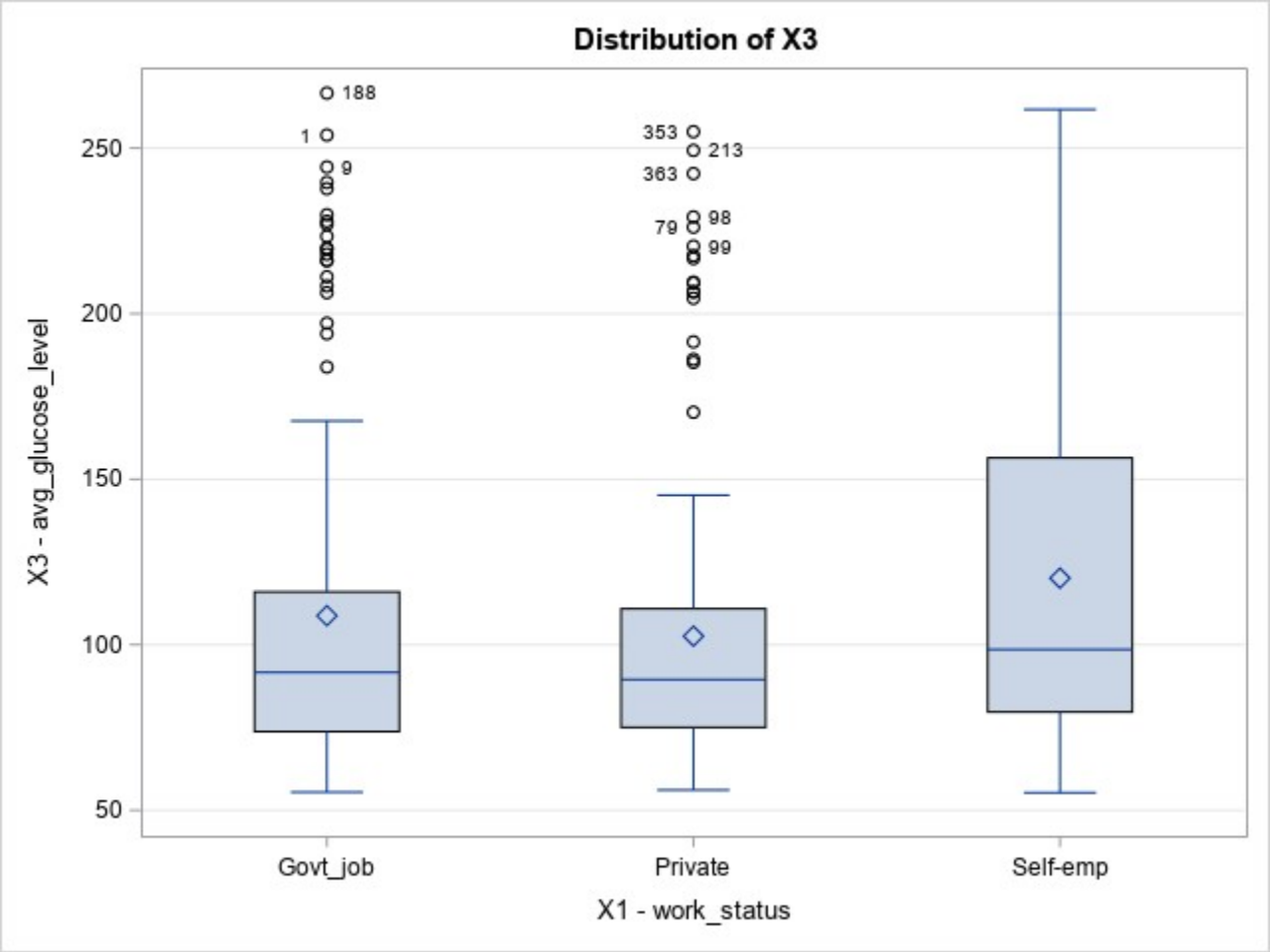
Source	DF	Type I SS	Mean Square	F Value	Pr > F
X1	2	23581.33184	11790.66592	4.61	0.0104
X2	2	2524.28092	1262.14046	0.49	0.6109

Source	DF	Type III SS	Mean Square	F Value	Pr > F
X1	2	23581.33184	11790.66592	4.61	0.0104
X2	2	2524.28092	1262.14046	0.49	0.6109


Interaction Plot for X3
X3 - avg_glucose_level
250
200
150
100
50
Govt_job
Private
Self-emp
X1 - work_status
X2
formerly
never_sm
smokes

SAS Program-Homework

The GLM Procedure



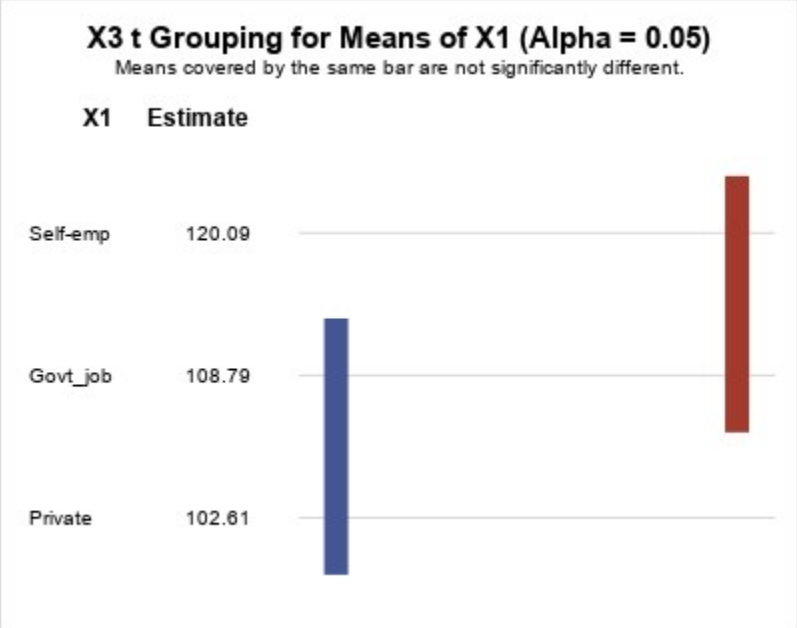
SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	445
Error Mean Square	2558.201
Critical Value of t	1.96531
Least Significant Difference	11.478



SAS Program-Homework

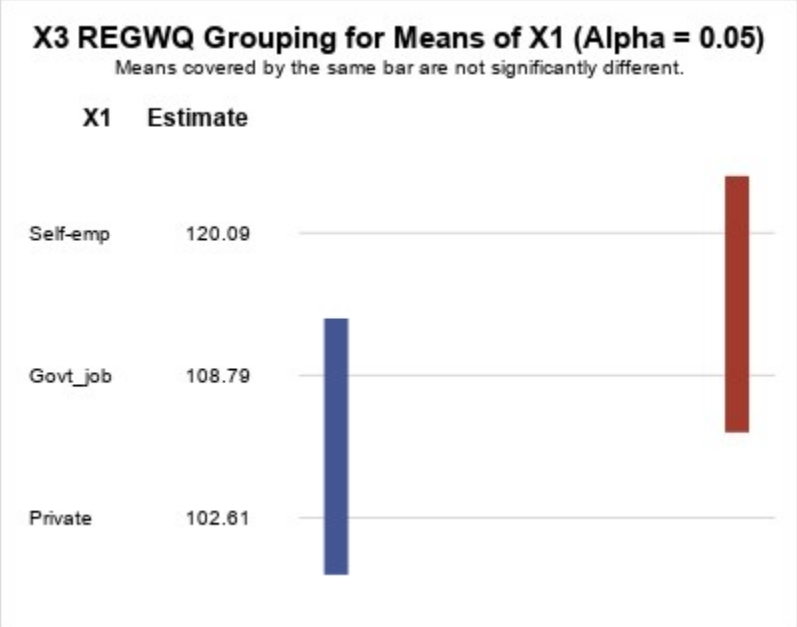
The GLM Procedure

Ryan-Einot-Gabriel-Welsch Multiple Range Test for X3

Note: This test controls the Type I experimentwise error rate.

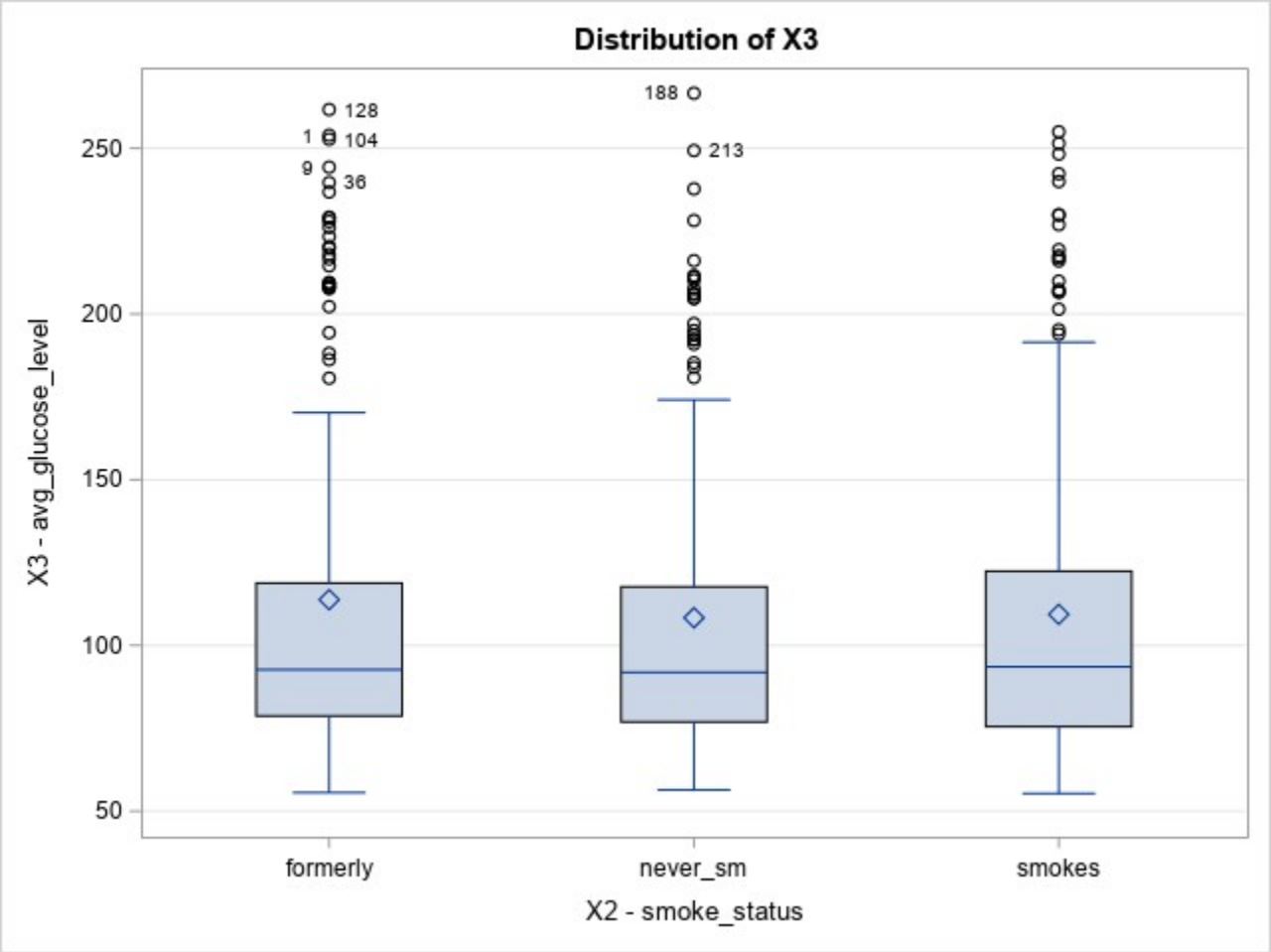
Alpha	0.05
Error Degrees of Freedom	445
Error Mean Square	2558.201

Number of Means	**2**	**3**
Critical Range	11.478037	13.73399



SAS Program-Homework

The GLM Procedure



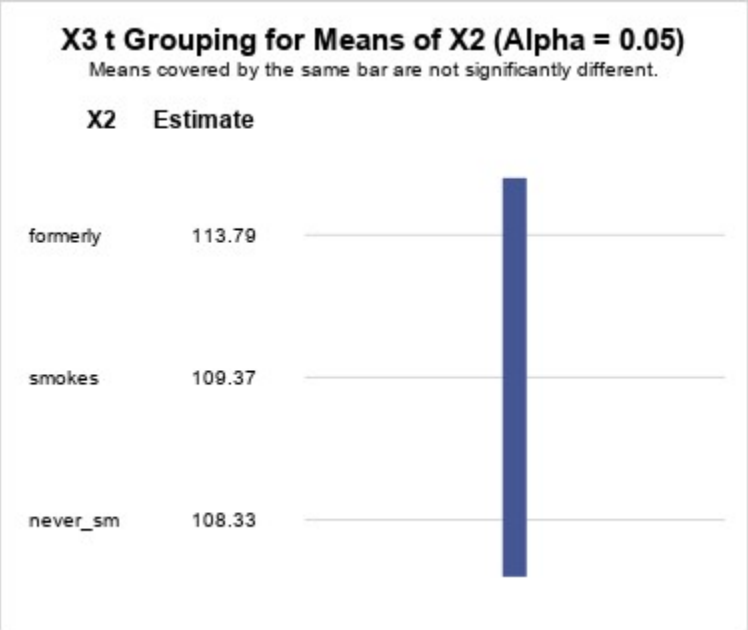
SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	445
Error Mean Square	2558.201
Critical Value of t	1.96531
Least Significant Difference	11.478



SAS Program-Homework

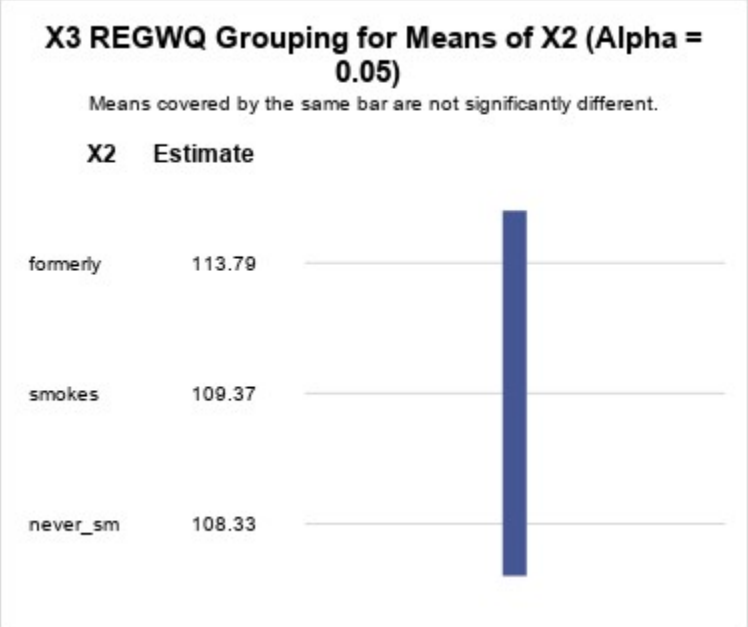
The GLM Procedure

Ryan-Einot-Gabriel-Welsch Multiple Range Test for X3

Note: This test controls the Type I experimentwise error rate.

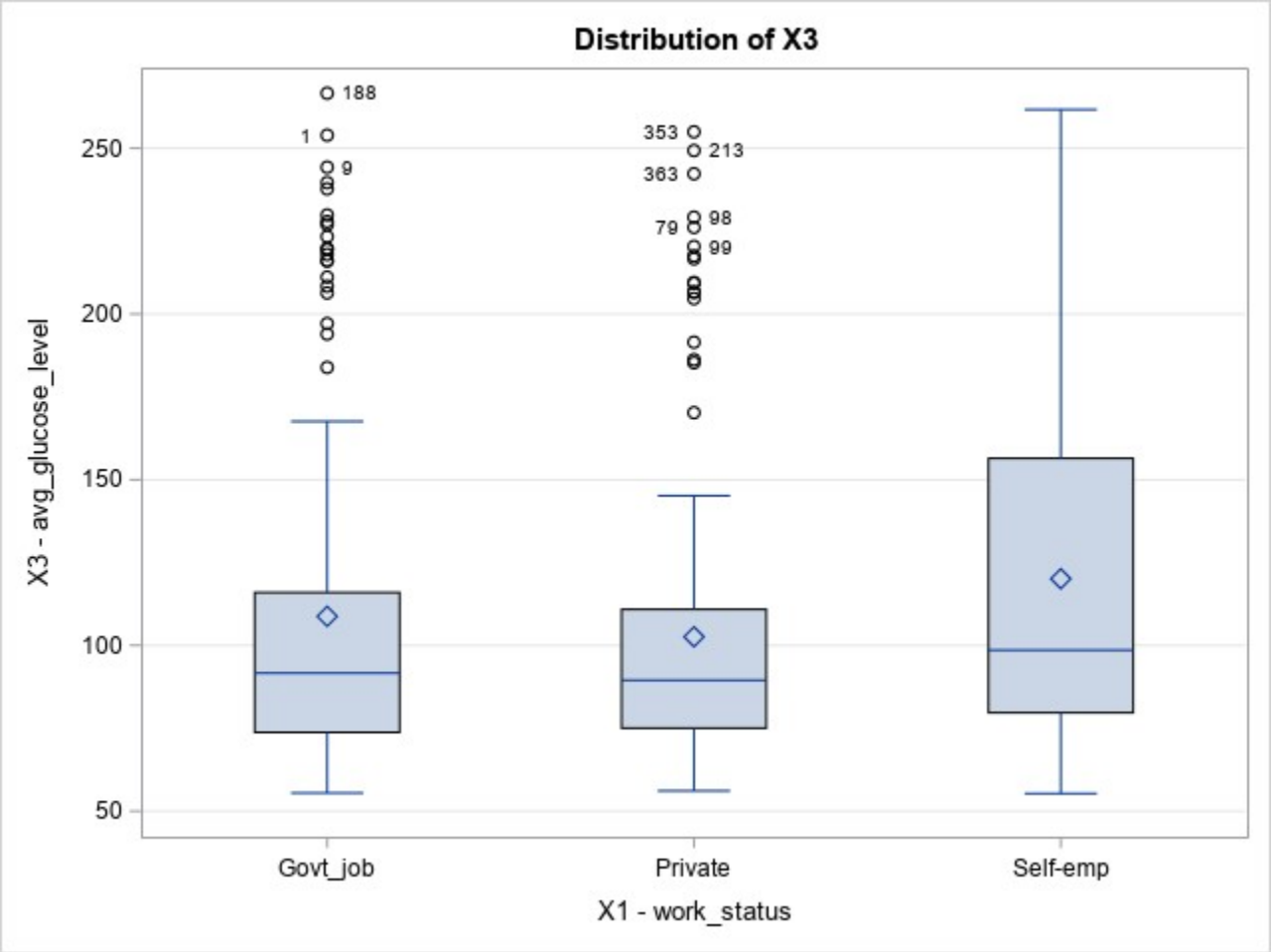
Alpha	0.05
Error Degrees of Freedom	445
Error Mean Square	2558.201

Number of Means	**2**	**3**
Critical Range	11.478037	13.73399

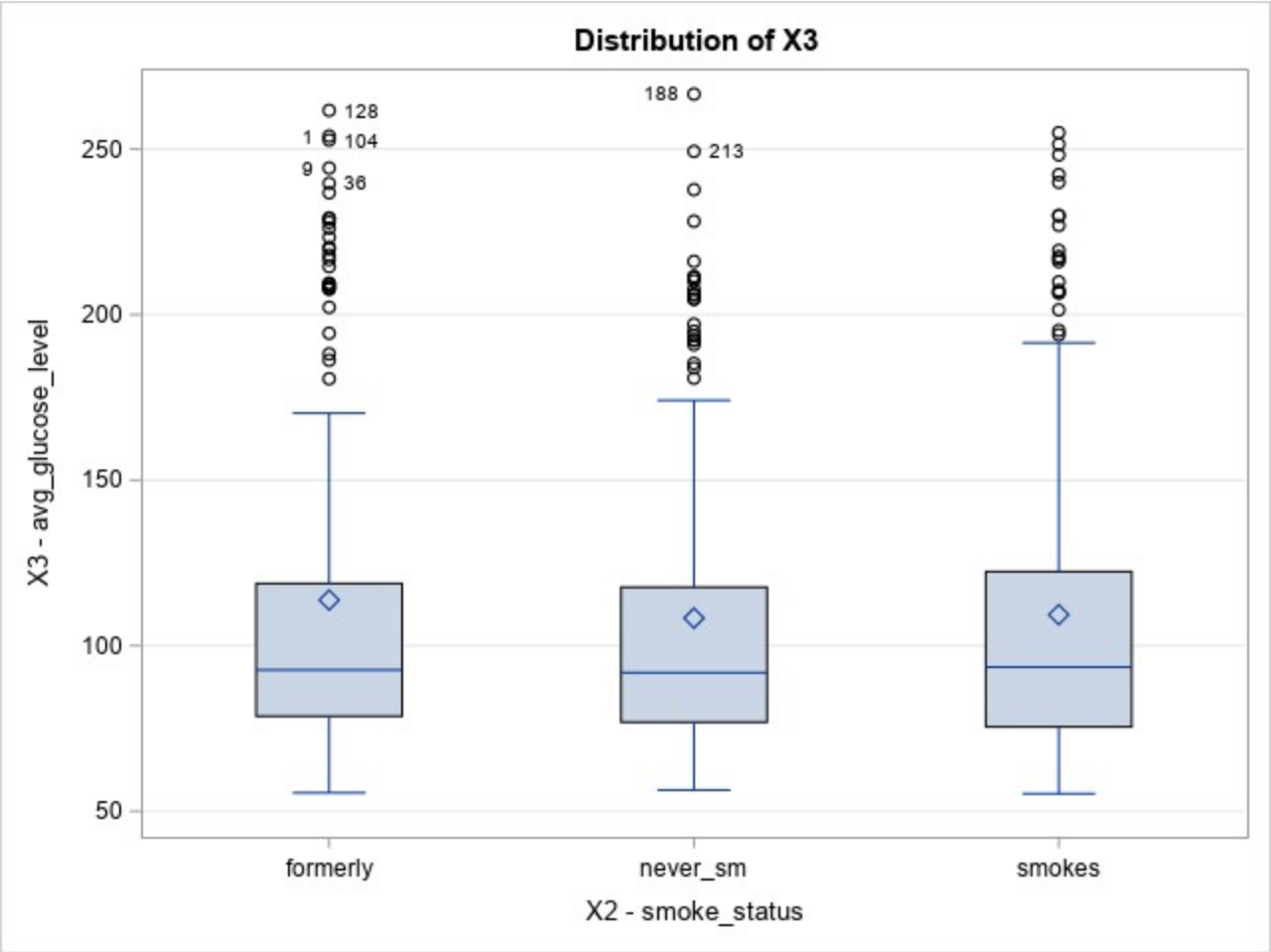


SAS Program-Homework

The GLM Procedure



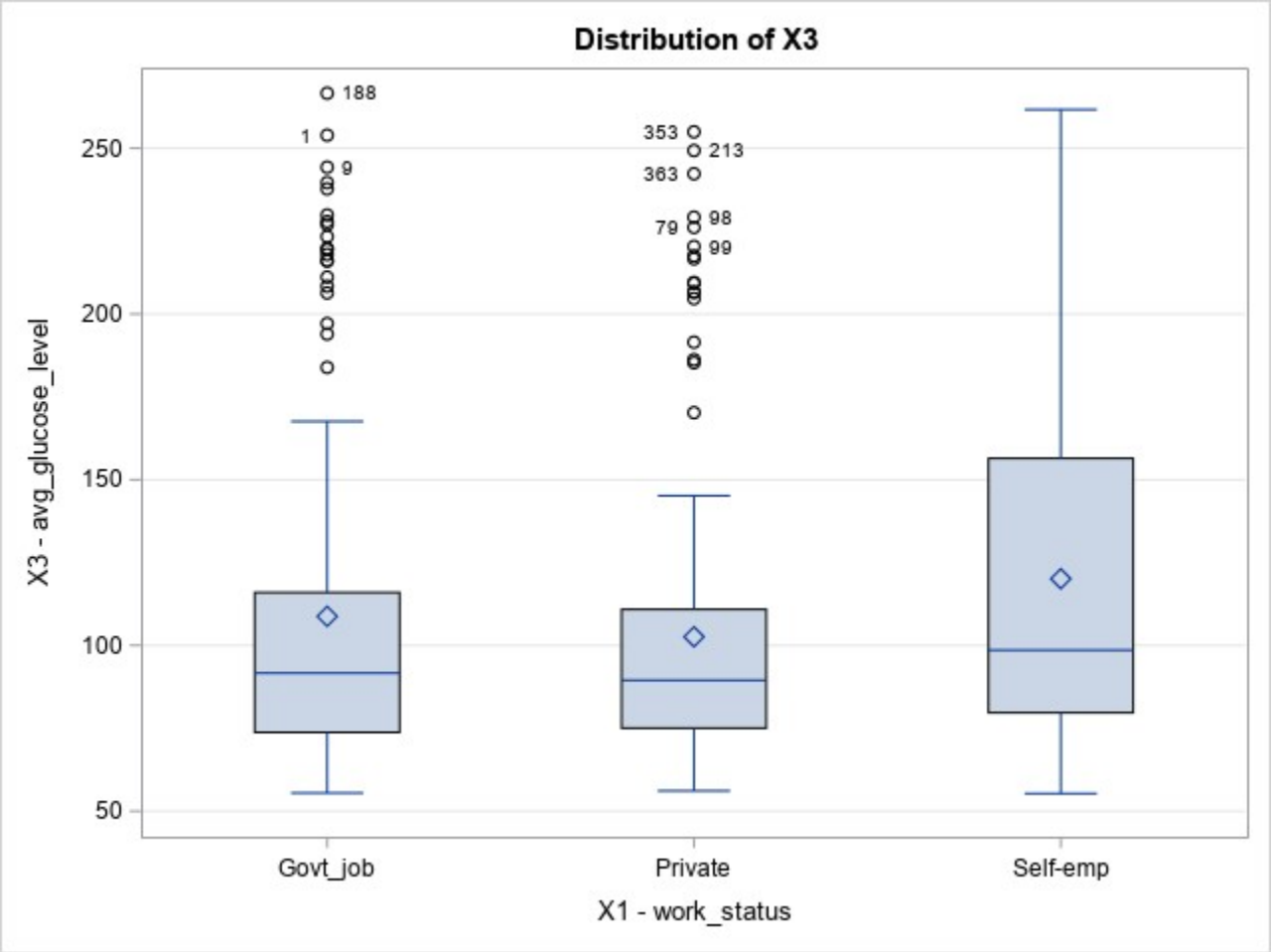
Level of X1	N	X3	
		Mean	Std Dev
Govt_job	150	108.788133	50.7874567
Private	150	102.612067	44.7762171
Self-emp	150	120.094733	55.4340129



Level of X2	N	X3	
		Mean	Std Dev
formerly	150	113.793133	55.6267511
never_sm	150	108.329000	47.0871853
smokes	150	109.372800	49.8697221

SAS Program-Homework

The GLM Procedure



SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	445
Error Mean Square	2558.201
Critical Value of t	1.96531
Least Significant Difference	11.478

Comparisons significant at the 0.05 level are indicated by *.**

X1 Comparison	Difference Between Means	95% Confidence Limits		
Self-emp - Govt_job	11.307	-0.171	22.785	
Self-emp - Private	17.483	6.005	28.961	***
Govt_job - Self-emp	-11.307	-22.785	0.171	
Govt_job - Private	6.176	-5.302	17.654	
Private - Self-emp	-17.483	-28.961	-6.005	***
Private - Govt_job	-6.176	-17.654	5.302	

SAS Program-Homework

The GLM Procedure

Bonferroni (Dunn) t Tests for X3

Note: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than Tukey's for all pairwise comparisons.

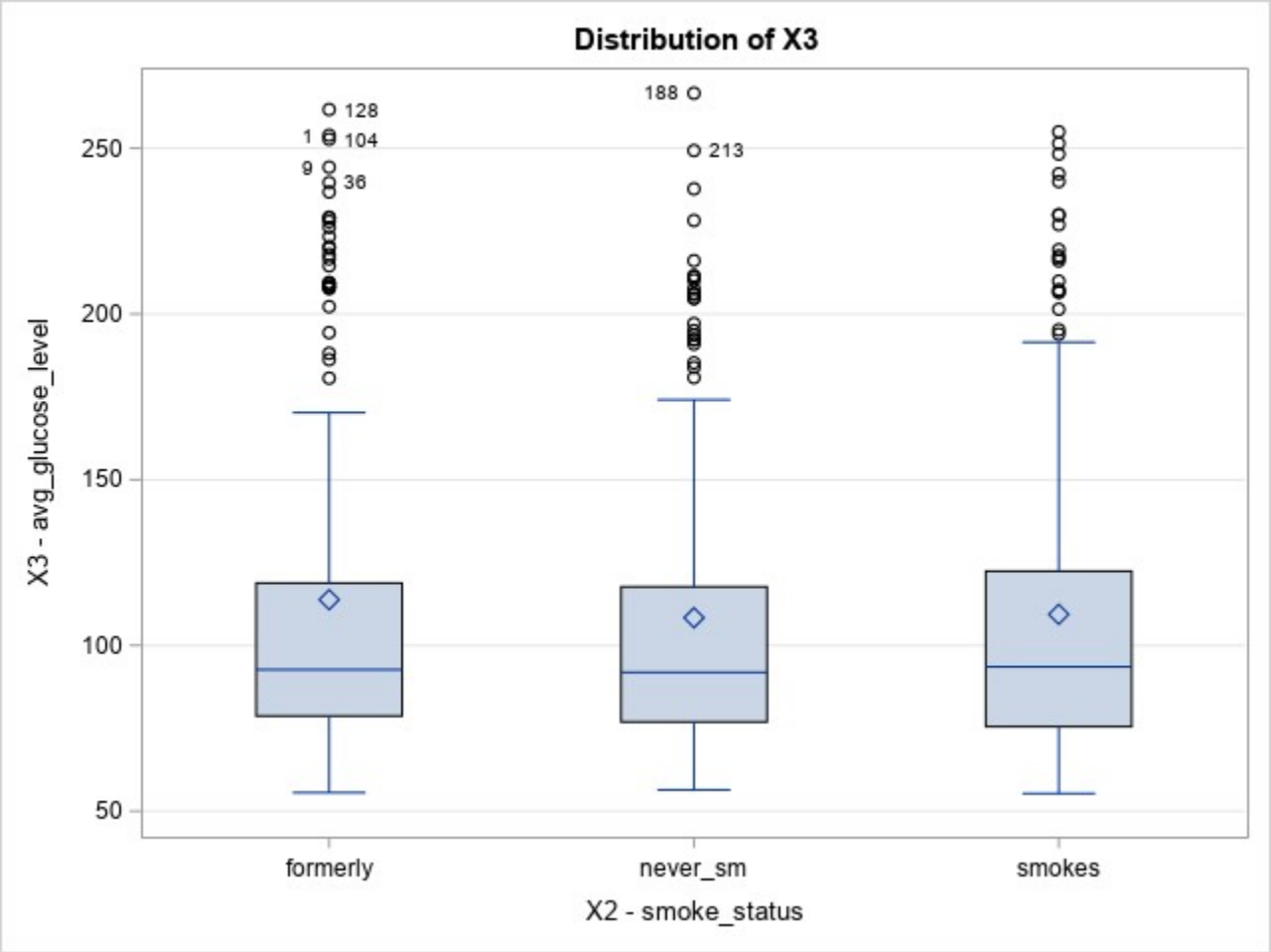
Alpha	0.05
Error Degrees of Freedom	445
Error Mean Square	2558.201
Critical Value of t	2.40307
Minimum Significant Difference	14.035

Comparisons significant at the 0.05 level are indicated by *.**

X1 Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
Self-emp - Govt_job	11.307	-2.728	25.341	
Self-emp - Private	17.483	3.448	31.517	***
Govt_job - Self-emp	-11.307	-25.341	2.728	
Govt_job - Private	6.176	-7.859	20.211	
Private - Self-emp	-17.483	-31.517	-3.448	***
Private - Govt_job	-6.176	-20.211	7.859	

SAS Program-Homework

The GLM Procedure



SAS Program-Homework

The GLM Procedure

t Tests (LSD) for X3

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	445
Error Mean Square	2558.201
Critical Value of t	1.96531
Least Significant Difference	11.478

Comparisons significant at the 0.05 level are indicated by *.**

X2 Comparison	Difference Between Means	95% Confidence Limits		
formerly - smokes	4.420	-7.058	15.898	
formerly - never_sm	5.464	-6.014	16.942	
smokes - formerly	-4.420	-15.898	7.058	
smokes - never_sm	1.044	-10.434	12.522	
never_sm - formerly	-5.464	-16.942	6.014	
never_sm - smokes	-1.044	-12.522	10.434	

SAS Program-Homework

The GLM Procedure

Bonferroni (Dunn) t Tests for X3

Note: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than Tukey's for all pairwise comparisons.

Alpha	0.05
Error Degrees of Freedom	445
Error Mean Square	2558.201
Critical Value of t	2.40307
Minimum Significant Difference	14.035

Comparisons significant at the 0.05 level are indicated by *.**

X2 Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
formerly - smokes	4.420	-9.614	18.455	
formerly - never_sm	5.464	-8.571	19.499	
smokes - formerly	-4.420	-18.455	9.614	
smokes - never_sm	1.044	-12.991	15.078	
never_sm - formerly	-5.464	-19.499	8.571	
never_sm - smokes	-1.044	-15.078	12.991	