Appendix

Prince of Songkla University
Pattani Campus

Appendix
Data Structure and Programs Used

A. Data Structure

The raw data were entered into a file called *psu.mdb* using Microsoft Access. There are ten tables in the database *psu.mdb* (as shown the relationship diagram in Figure 2.1). The data for analysis was taken from this database. There are 294 subjects. The data file is call *master.mdb*, which is created by queries. Next, export the data from *master.mdb* to Microsoft Excel, and save as type *Text* into *master.num* to analyze with Matlab program. These data are as follows:

Id	sex	age	marital	domicil	occupation	experience	fac	Study plan	Study type	BA univer	BA major	BA progra	b_gpa	during	total years	m_gpa
001	2	33	1	4	1	8	9	1	1	1	3	2	2.28	9	2.45	3.62
002	2	24	1	9	1	2	9	1	1	3	3	4	3.4	2	1.94	3.65
003	2	26	1	1	1	4	9	2	1	1	2	4	2.87	8	1.52	3.52
004	2	50	2	1	1	31	9	1	2	1	3	2	2.84	18	3.45	3.75
005	1	34	2	4	1	13	9	2	1	3	1	2	2.61	13	2.02	3.6
006	2	39	2	2	1	19	9	2	2	3	1	4	2.8	15	2.47	3.5
007	1	46	2	3	1	22	9	2	2	3	2	2	2.21	23	1.97	3.5
008	1	30	2	2	1	9	9	2	2	3	2	4	3.24	9	1.97	3.21
009	1	33	2	1	1	10	9	2	2	2	3	2	2.3	7	2.02	3.71
010	2	40	2	3	1	17	9	2	1	1	2	2	2.7	16	3.95	3.3
011	1	33	2	9	1	12	9	1	1	2	3	2	3.15	8	2.97	3.76
012	1	39	2	4	1	15	9	1	1	1	3	4	2.23	17	2.76	3.53
013	1	34	2	8	1	7	9	1	1	1	3	2	3.4	9	2.10	3.92
014	1	42	2	1	1	14	9	1	1	4	2	4	2.08	15	3.90	3.25
015	1	26	1	2	1	3	9	1	1	1	2	4	2.63	3	3.49	3.53
016	2	34	1	2	1	13	9	1	1	1	2	2	2.05	13	2.13	3.72
017	1	37	2	3	1	9	9	2	2	2	2	4	2.57	16	2.94	3.58
018	2	28	1	1	1	7	9	2	2	2	1	2	2.3	1	2.94	3.62
019	2	34	2	1	1	12	9	1	1	1	1	4	2.62	13	2.28	3.76
020	2	23	1	4	2	1	9	1	1	1	3	4	3.23	2	2.30	3.52
021	2	22	1	4	0	0	9	2	1	1	2	4	2.55	1	4.47	3.12
022	1	27	1	13	2	7	9	2	2	1	1	4	2.23	4	4.07	3.6
023	2	28	1	8	1	1	9	2	2	1	3	4	2.61	6	3.47	3.14
024	2	23	1	4	1	1	9	2	2	1	3	4	3.65	1	2.47	3.14
025	2	23	1	4	1	2	9	2	2	1	2	4	2.84	3	2.08	3.84
026	1	33	2	1	1	12	9	2	2	2	2	2	2.3	3	3.10	3.09
027	1	24	1	2	1	4	9	1	2	1	2	4	3.34	5	2.15	3.8

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Id	sex	age	Marital	domicil	Occupation	experience	fac	Study plan	Study type	BA univer	BA major	BA progra	B_gpa	during	total years	m_gpa
028	1	39	2	1	1	17	9	2	2	3	3	2	2.8	11	1.97	3.21
029	2	26	1	4	1	5	9	2	2	1	3	4	3.17	3	2.75	3.66
030	1	27	1	8	1	4	9	1	1	1	3	4	3.36	5	1.77	3.7
031	1	24	2	8	1	2	9	1	1	3	3	4	3.6	3	2.44	3.7
032	2	38	1	2	1	1	9	2	2	2	3	2	2.58	8	3.07	3.94
033	2	32	3	1	1	10	9	2	2	1	2	4	2.88	11	3.07	3.5
034	1	30	2	3	1	20	9	2	2	1	3	2	2.54	12	3.17	3.13
035	2	26	2	13	1	2	9	1	1	3	3	4	3.5	3	4.08	3.8
036	1	26	1	2	1	4	9	2	1	1	1	4	2.95	4	4.05	3.8
037	1	30	1	1	1	10	10	1	1	1	1	2	3.43	6	3.44	3.66
038	1	25	1	4	0	0	10	1	1	4	2	4	3.4	2	3.49	3.15
039	1	28	1	1	1	1	10	1	1	4	2	4	3.45	2	3.53	3.23
040	2	32	2	2	1	9	10	1	1	1	2	4	2.76	11	4.09	3.38
041	2	24	1	3	1	2	10	1	1	3	2	4	3.15	2	4.38	3.38
042	2	30	1	2	1	6	10	1	1	1	2	4	3.21	8	5.44	3.3
043	2	22	1	4	0	0	10	1	1	1	2	4	2.66	1	3.07	3.55
044	2	30	2	5	1	6	10	1	1	1	2	2	3.23	4	4.08	3.47
045	2	37	1	3	1	13	10	1	1	1	2	2	2.86	11	5.11	3.69
046	2	37	2	1	1	15	10	1	1	1	3	2	2.74	17	4.07	3.47
047	2	26	1	5	1	6	10	1	1	2	2	2	2.4	3	3.05	3.5
048	2	24	1	3	1	3	10	1	1	1	2	4	3.09	4	5.32	3.66
049	2	22	1	9	0	0	10	1	1	1	2	4	2.73	1	5.07	3.25
050	2	34	1	13	1	15	10	1	1	1	2	2	2.63	13	4.94	3.68
051	2	42	2	2	1	18	10	1	1	1	2	2	2.54	13	6.08	3.14
052	1	26	1	4	1	3	10	1	1	1	2	4	2.42	6	3.08	3.5
053	2	21	1	4	0	0	10	1	1	1	2	4	2.67	1	5.15	3.05
054	2	35	1	8	1	13	10	1	1	1	2	4	3.25	14	5.13	3.57
055	2	22	1	13	0	0	10	1	1	1	2	4	2.82	1	3.33	3.28
056	2	38	2	2	1	15	10	1	1	3	2	4	3.49	9	4.02	3.86
057	1	22	1	99	0	0	10	1	1	1	2	4	2.79	1	2.10	3.78
058	1	40	3	99	1	17	10	1	1	2	2	2	2.5	5	2.94	3.66
059	2	23	1	8	0	0	10	1	1	1	3	4	3.1	0	2.65	3.5
060	1	21	1	34	0	0	10	1	1	1	2	4	3.91	1	3.07	3.91
061	2	30	2	4	1	2	10	1	1	1	2	4	2.32	8	3.98	3.83
062	1	50	2	2	1	28	10	1	1	2	2	2	2.58	6	4.30	3
063	2	42	2	5	1	21	10	2	1	3	2	2	2.46	13	3.28	3.6
064	2	40	2	3	1	21	10	1	1	1	2	4	2.78	17	3.07	3.72
065	1	40	2	4	2	1	10	1	1	4	2	4	2.7	2	3.06	3.09
066	2	22	1	30	0	0	10	1	1	1	2	4	2.73	1	3.07	3.81
067	1	33	2	1	1	9	11	1	1	1	1	4	2.51	11	3.01	3.2
068	1	35	2	4	1	11	11	1	1	1	1	2	3.3	2	3.04	3.2
069	2	33	2	1	1	12	11	1	1	3	1	2	3.32	2	3.01	3.29
070	2	27	1	1	1	4	11	1	1	1	1	4	3.15	5	3.01	3.64
071	1	27	2	1	1	3	11	1	1	1	1	4	2.49	5	3.08	3.35

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Id	sex	age	marital	domicil	occupation	experience	fac	Study plan	Study type	BA univer	BA major	BA progra	B_gpa	during	total years	m_gpa
072	1	32	2	1	1	7	11	1	1	1	1	4	2.24	11	3.01	3.27
073	2	32	2	1	1	5	11	1	1	1	1	4	2.26	12	3.01	3.82
074	1	35	2	4	1	12	5	1	1	1	1	4	2.3	13	8.42	3.25
075	1	33	2	4	1	8	5	1	1	1	2	4	2.65	9	7.95	3.31
076	1	35	2	4	1	13	5	1	1	3	1	2	2.74	2	8.91	3.17
077	1	50	2	4	1	12	5	1	1	1	1	2	2.78	3	7.06	3.17
078	2	39	1	1	1	15	5	1	1	3	2	2	2.64	4	5.79	3.25
079	1	35	2	3	1	11	5	1	1	1	1	4	2.06	13	7.01	3.08
080	1	28	1	4	1	2	5	1	1	1	1	4	2.22	6	3.08	3.09
081	1	27	1	4	1	5	5	1	1	2	1	2	2.41	2	3.08	3.56
082	1	26	1	9	1	3	5	1	1	1	1	4	2.25	3	3.05	3.34
083	2	44	1	8	1	22	5	1	1	1	3	2	2.36	22	3.22	3.48
084	2	42	2	4	1	18	5	1	1	1	1	2	3.25	12	3.76	3.51
085	1	23	1	6	0	0	5	1	1	1	1	4	2.56	0	3.21	3.25
086	1	32	2	10	1	6	5	1	1	1	1	2	2.6	2	3.86	3.08
087	2	23	1	6	0	0	5	1	1	1	1	4	2.64	1	3.41	3.31
088	2	23	1	14	0	0	5	1	1	3	1	4	3.46	1	3.93	3.34
089	1	23	1	4	0	0	5	1	1	1	1	4	2.66	1	3.58	3.34
090	1	31	2	4	1	10	5	1	1	2	1	2	2.52	6	3.39	3.42
091	2	22	1	2	0	0	5	1	1	1	1	4	2.81	1	3.49	3.6
092	2	29	1	99	1	5	5	1	1	1	1	4	2.14	7	3.26	3.28
093	2	22	1	4	0	0	5	1	1	1	1	4	3.3	1	4.07	3.34
094	2	23	1	7	0	0	5	1	1	1	1	4	2.88	1	5.05	3.65
095	1	40	2	14	1	18	5	1	1	3	2	2	2.31	10	6.92	3
096	1	22	1	40	0	0	7	1	1	3	1	4	3.68	0	3.04	3.19
097	1	24	1	4	2	1	7	1	1	1	1	4	2.59	2	3.03	3.85
098	2	27	1	4	1	2	7	1	1	1	1	4	3.16	4	3.05	3.71
099	1	25	1	31	2	2	7	1	1	1	1	4	3.23	2	3.06	3.56
100	1	39	2	4	1	15	6	2	1	1	1	2	3.2	16	2.04	3.92
101	1	47	2	4	1	21	6	2	1	1	1	2	2.32	12	2.04	3.48
102	1	47	2	1	1	22	6	2	1	2	1	2	2.58	10	2.04	3.31
103	1	40	2	4	1	15	6	1	1	2	1	2	2.72	9	4.07	3.53
104	2	22	1	4	0	0	7	1	1	1	1	4	2.5	0	5.07	3.43
105	2	27	1	99	2	3	7	1	1	3	1	2	3.19	4	4.07	3.03
106	1	41	2	7	1	20	6	1	1	2	1	4	2.3	3	2.04	3.74
107	2	23	1	4	0	0	7	1	1	1	1	4	2.5	2	6.08	3.03
108	2	22	1	2	0	0	6	1	1	1	1	4	2.42	0	2.95	3.19
109	1	23	1	41	0	0	6	1	1	1	1	4	2.91	0	2.93	3.26
110	1	34	2	4	1	10	6	1	1	2	1	2	2.3	7	5.07	3.26
111	1	24	1	4	0	0	7	1	1	1	1	4	2.63	1	3.55	3.76
112	2	23	1	4	0	0	7	1	1	1	1	4	2.71	1	3.49	3.6
113	2	28	1	7	1	8	7	1	1	1	1	4	2.15	7	4.08	3.7
114	2	23	1	4	1	1	7	1	1	1	1	4	2.66	1	3.43	3.16
115	2	29	1	4	1	7	6	1	1	1	1	4	3	7	8.08	3.96

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Id	sex	age	marital	domicil	occupation	experience	fac	Study plan	Study type	BA univer	BA major	BA progra	b_gpa	during	total years	m_gpa
116	1	23	1	13	0	0	6	1	1	1	1	2	2.87	0	3.45	3.02
117	2	28	1	20	0	0	6	1	1	1	1	2	3.1	0	3.56	3.21
118	2	24	1	8	2	2	6	1	1	1	1	4	2.61	3	3.58	3.46
119	1	34	2	4	1	12	6	1	1	1	1	2	2.8	10	3.58	3.4
120	1	33	2	4	1	6	6	1	1	1	1	2	2.75	10	4.04	3.3
121	2	22	1	21	0	0	6	1	1	1	1	4	3.48	1	2.91	3.71
122	2	27	2	9	1	14	6	1	1	1	1	4	2.78	15	2.48	3.96
123	2	23	1	8	0	0	6	1	1	1	1	4	3.26	0	2.47	3.83
124	2	26	1	9	1	4	2	1	1	3	1	4	2.49	4	4.97	3.41
125	2	37	2	4	1	13	2	1	1	1	1	4	2.95	13	5.07	3.58
126	2	33	1	4	1	10	2	1	1	1	1	4	2.9	10	4.98	3.55
127	1	28	1	8	1	5	2	1	1	3	1	4	3	5	2.99	3.56
128	2	27	1	3	1	3	2	1	1	3	1	4	2.79	3	6.00	3.44
129	2	25	1	50	1	3	2	1	1	3	1	4	3.24	4	2.99	3.31
130	2	28	1	7	1	5	2	1	1	3	1	4	2.6	2	3.08	3.72
131	2	26	1	4	1	3	2	1	1	3	1	4	3.28	3	2.40	3.62
132	2	25	1	7	1	3	2	1	1	3	1	4	2.39	3	3.03	3.13
133	2	25	1	7	1	3	2	1	1	3	1	4	3.07	3	3.01	3.65
134	2	36	1	15	1	13	2	1	1	3	1	4	2.58	13	3.26	3.58
135	2	24	1	4	1	2	2	1	1	1	1	4	3.48	3	4.50	4
136	2	25	1	9	1	4	2	1	1	1	1	4	3.57	4	3.08	3.72
137	2	33	2	4	1	10	2	1	1	3	1	4	2.81	12	4.07	3.2
138	1	30	2	4	1	6	1	2	3	2	2	4	3.31	7	3.30	3.2
139	1	33	1	8	1	9	1	2	3	2	2	4	2.49	10	2.85	3.33
140	1	39	2	4	1	14	1	2	3	2	2	2	2.77	8	2.85	3.2
141	1	38	2	4	2	13	1	2	3	2	2	4	2.36	16	2.85	3.86
142	1	41	2	2	1	15	1	2	3	2	2	4	2.82	19	2.85	3.4
143	1	28	1	4	1	7	1	2	3	2	1	2	2.52	2	3.30	3.4
144	1	44	2	4	1	21	1	2	3	1	1	4	2.3	22	4.25	3.16
145	1	32	2	4	1	9	1	2	3	2	2	4	2.82	9	4.30	3.13
146	1	37	2	13	1	8	1	2	3	2	2	4	2.61	14	4.30	3.06
147	2	42	2	4	1	16	1	2	3	3	1	4	2.75	19	2.30	3.2
148	2	23	1	4	0	0	4	1	1	1	1	4	2.43	1	3.44	3.17
149	1	26	1	8	1	3	4	1	1	3	1	4	2.6	3	3.08	3.44
150	2	23	1	1	0	0	4	1	1	1	1	4	2.83	0	2.60	3
151	2	22	1	4	0	0	4	1	1	1	1	4	2.85	0	8.01	3.23
152	2	22	1	4	1	1	4	1	1	1	1	4	3.04	0	7.82	3.09
153	1	33	1	4	1	2	3	1	1	4	1	4	3.5	11	4.33	3.7
154	1	31	2	4	1	11	3	1	1	1	1	2	3.15	5	6.74	3.31
155	1	27	1	99	2	5	3	1	1	1	1	4	2.84	5	2.45	3.8
156	2	23	1	4	2	1	3	1	1	1	1	4	2.76	1	3.36	3.12
157	1	32	2	7	1	11	3	1	1	1	1	2	2.57	8	3.37	3
158	1	31	2	4	2	7	1	2	3	2	2	4	2.69	7	2.78	3.2
159	1	42	2	3	1	10	1	2	3	1	2	4	2.97	20	2.78	3.2
160	1	45	2	2	1	23	1	2	3	3	3	2	3.22	0	2.78	3.73

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Id	sex	age	marital	domicil	occupation	experience	fac	Study plan	Study type	BA univer	BA major	BA progra	b_gpa	during	total years	m_gpa
161	1	29	1	13	1	5	1	2	3	2	1	2	3.2	2	2.78	3.73
162	1	29	2	5	1	5	1	2	3	1	2	4	2.67	17	3.29	3.2
163	1	31	1	4	2	3	1	2	3	2	2	2	2.3	1	2.71	3.12
164	1	24	1	4	2	1	1	2	3	4	1	4	2.75	2	2.32	3.37
165	1	29	1	9	2	3	1	2	3	1	1	4	2.63	4	2.32	3.31
166	1	22	1	33	0	0	7	1	1	1	1	4	3.8	0	3.81	3.8
167	2	26	1	4	1	4	5	1	1	2	1	2	2.44	2	1.70	3.34
168	1	25	1	4	1	2	6	1	1	1	1	2	3.07	2	3.73	3.88
169	1	32	1	8	1	1	5	1	1	1	1	4	3.82	2	2.76	3.82
170	2	24	1	7	0	0	7	1	1	1	1	4	2.62	1	3.32	3.16
171	2	25	1	15	2	2	7	1	1	1	1	4	3.36	4	2.45	3.66
172	2	27	1	13	0	0	7	1	1	1	1	4	3.35	5	3.21	3.66
173	2	20	1	3	0	0	6	1	1	1	1	4	2.65	1	2.47	3.36
174	2	22	1	4	0	0	7	1	1	1	1	4	2.74	1	3.68	3.23
175	1	39	2	5	1	15	6	1	1	2	1	2	3	8	3.72	3.69
176	1	31	2	8	1	11	6	1	1	3	1	2	2.85	1	3.50	3.26
177	2	22	1	41	0	0	6	1	1	1	1	4	3.04	0	2.33	3.24
178	2	31	1	7	2	7	6	1	1	1	1	4	2.76	7	2.24	3.66
179	1	31	1	13	1	7	6	1	1	1	1	4	2.54	8	5.08	3.63
180	1	23	1	2	0	0	4	1	1	1	1	4	2.72	1	2.74	3.16
181	2	21	1	3	0	0	4	1	1	1	1	4	2.57	1	6.27	3.45
182	2	22	1	4	0	0	4	1	1	1	1	4	2.78	1	3.69	3.21
183	2	34	2	4	1	11	4	1	1	1	1	4	2.42	13	4.64	3
184	2	28	1	4	1	4	4	1	1	1	1	4	2.38	6	3.48	3.09
185	2	23	1	2	1	1	4	1	1	1	1	4	2.6	2	3.56	3.02
186	2	22	1	6	0	0	4	1	1	1	1	4	3.72	1	3.56	3.72
187	1	25	1	4	2	3	3	1	1	1	1	4	2.68	3	3.34	3.7
188	1	23	1	4	1	1	3	1	1	1	1	4	2.99	4	5.13	3.7
189	2	21	1	99	0	0	3	1	1	1	1	4	3.3	0	2.27	3.7
190	1	37	2	4	2	13	1	2	3	2	2	4	2.36	16	2.76	3.86
191	2	25	1	8	1	4	1	2	3	2	2	4	2.54	3	2.76	3.26
192	2	31	2	4	2	9	1	2	3	1	1	4	2.85	10	2.28	3.43
193	2	24	1	4	0	0	1	2	3	1	1	4	2.45	3	2.28	3
194	2	22	1	4	2	1	1	2	3	4	2	4	2.92	1	1.91	3.85
195	1	30	1	4	2	6	1	2	3	1	1	4	2.08	7	3.28	3.25
196	1	26	1	4	2	4	1	2	3	1	1	4	2.76	5	2.28	3.43
197	2	26	1	4	2	5	1	2	3	1	1	4	3.04	4	2.68	3.68
198	1	36	2	4	1	13	1	2	3	2	1	4	2.43	14	2.78	3.25
199	1	25	1	4	2	2	5	1	1	1	1	4	2.57	2	4.45	3.48
200	2	33	1	42	1	11	5	1	1	1	1	4	2.58	12	4.91	3.71
201	1	31	2	8	1	7	5	1	1	3	1	2	2.8	7	4.10	3.4
202	1	32	1	4	1	4	5	1	1	3	1	2	2.29	7	4.14	3.31
203	1	35	3	8	1	11	5	1	1	2	2	4	2.49	7	3.28	3.4
204	1	35	2	8	1	13	5	1	1	1	1	2	3.17	2	2.51	3.42

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Id	sex	age	marital	domicil	occupation	experience	fac	Study plan	Study type	BA univer	BA major	BA progra	b_gpa	during	total years	m_gpa
205	2	27	1	4	1	5	5	1	1	1	1	4	2.66	5	2.78	3.25
206	1	26	1	99	0	0	3	1	1	1	1	4	2.34	1	5.72	3.38
207	1	23	1	99	0	0	3	1	1	1	1	4	2.24	1	5.72	3.38
208	2	23	1	7	1	1	7	1	1	1	1	4	2.97	0	3.82	3.45
209	2	24	1	7	2	2	7	1	1	1	1	4	2.25	2	3.82	3.45
210	1	24	1	8	2	2	7	1	1	1	1	4	2.16	2	3.07	3.23
211	2	25	1	1	2	2	7	1	1	1	1	4	3.01	2	2.31	3.9
212	2	32	2	41	1	7	6	1	1	1	1	4	2.9	9	2.06	3.6
213	1	40	2	14	1	14	6	1	1	1	1	2	2.73	15	2.10	3.88
214	2	31	1	13	1	9	2	1	1	1	1	4	3.22	9	2.48	3.82
215	2	36	2	8	1	11	2	1	1	1	1	4	2.66	12	2.33	3.58
216	2	29	1	15	1	8	2	1	1	1	1	2	3.55	6	2.36	3.64
217	2	25	1	3	1	4	2	1	1	1	1	2	3.5	2	3.49	3.61
218	1	27	2	8	1	4	2	1	1	3	1	4	2.89	4	2.22	3.55
219	2	35	1	8	1	11	2	1	1	1	1	4	2.46	11	4.08	3.58
220	2	26	1	7	1	4	2	1	1	3	1	4	3.14	4	3.86	3.2
221	2	27	1	4	1	6	4	1	1	2	1	4	2.39	6	2.72	3.33
222	1	25	1	8	1	3	4	1	1	1	1	4	2.25	3	2.91	3.09
223	1	36	2	4	1	14	4	1	1	1	3	4	2.31	16	6.27	3.47
224	1	26	1	99	1	3	4	1	1	1	1	4	2.11	4	6.16	3.45
225	1	23	1	8	0	0	4	1	1	1	1	4	2.78	1	4.07	3.63
226	1	31	1	2	1	6	4	1	1	1	1	4	3.33	7	6.47	3.33
227	2	24	1	35	0	0	4	1	1	1	1	2	3.31	2	3.45	3.65
228	2	21	1	36	0	0	5	1	1	1	1	4	3.5	1	2.58	3.68
229	1	32	2	8	1	11	5	1	1	1	1	2	3.34	3	2.43	3.42
230	2	36	2	13	1	14	5	1	1	1	1	2	3.04	14	2.86	3.34
231	1	27	1	99	2	5	5	1	1	4	1	2	3.06	1	2.75	3.08
232	2	24	1	4	2	2	7	1	1	1	1	4	3.31	3	3.50	3.51
233	2	22	1	1	0	0	7	1	1	1	1	4	3.43	1	2.84	3.4
234	1	22	1	3	0	0	7	1	1	1	1	4	2.53	1	2.57	3.06
235	2	41	3	22	1	17	7	1	1	1	1	4	2.12	17	2.71	3.03
236	1	25	1	4	2	1	6	1	1	1	1	4	3.48	3	2.97	3.81
237	2	23	1	4	0	0	6	1	1	3	1	2	3.08	0	5.71	3.48
238	1	22	1	9	0	0	6	1	1	1	1	4	2.99	1	4.38	3.66
239	2	24	1	3	0	0	6	1	1	1	1	4	2.59	0	3.92	3.51
240	2	25	1	13	0	0	6	1	1	3	1	2	2.51	2	1.64	3.11
241	1	37	2	13	1	13	6	1	1	3	1	2	2.51	8	2.90	3.5
242	2	27	1	3	1	4	2	1	1	3	1	4	2.84	4	4.41	3.35
243	1	23	1	37	0	0	4	1	1	1	1	4	2.57	1	2.75	3.25
244	1	27	1	42	1	5	4	1	1	2	1	4	2.51	4	5.62	3.46
245	2	29	2	4	1	7	4	1	1	1	1	4	2.18	8	4.62	3.61
246	1	25	2	23	1	3	4	1	1	3	1	4	2.62	3	3.62	3.15
247	2	22	1	38	0	0	4	1	1	1	1	4	2.81	1	3.99	3.45
248	2	22	1	4	0	0	4	1	1	1	1	4	3.03	0	4.38	3.47
249	2	22	1	4	0	0	4	1	1	1	1	4	2.52	0	5.07	3.02

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Id	sex	age	marital	domicil	occupation	experience	fac	Study plan	Study type	BA univer	BA major	BA progra	b_gpa	during	total years	m_gpa
250	1	22	1	8	0	0	3	1	1	1	1	4	3.04	1	2.25	3.33
251	2	23	1	4	2	2	3	1	1	1	1	4	2.38	2	2.36	3.2
252	2	27	1	4	2	3	3	1	1	1	1	4	2	3	2.36	3.19
253	1	28	1	4	2	2	1	2	3	2	1	4	2.69	8	3.76	3.5
254	1	25	1	4	2	3	1	2	3	1	1	4	2.76	4	2.32	3.5
255	1	33	2	4	1	12	1	2	3	2	2	4	2.66	4	2.96	3.56
256	1	29	1	4	1	8	5	1	1	1	1	2	2.8	3	3.41	3.17
257	2	26	1	3	1	4	5	1	1	3	1	4	2.79	4	4.42	3.31
258	1	28	1	4	1	5	5	1	1	1	1	2	2.68	5	4.50	3.48
259	2	24	1	4	2	2	7	1	1	1	1	4	2.9	3	3.65	3.3
260	2	22	1	8	0	0	7	1	1	1	1	4	3.36	0	3.03	3.9
261	2	23	1	2	0	0	7	1	1	3	1	2	3.28	0	4.75	3.13
262	2	22	1	99	0	0	7	1	1	1	1	4	3.08	1	3.97	3.1
263	1	24	1	4	1	1	7	1	1	3	1	2	3.07	1	3.07	3.03
264	2	22	1	4	0	0	7	1	1	1	1	4	2.85	1	3.69	3.26
265	1	26	1	4	2	4	7	1	1	1	1	2	3.2	4	5.66	3.16
266	2	45	1	9	1	14	6	1	1	4	1	4	2.43	14	4.04	3.61
267	1	31	1	39	1	4	6	1	1	3	1	2	3.25	8	2.55	3.84
268	1	33	2	4	1	11	6	1	1	2	1	2	2.48	7	2.53	3.61
269	1	28	1	5	2	3	1	2	3	1	1	4	2.52	6	4.05	3.5
270	1	32	2	2	2	12	1	2	3	2	2	2	2.44	5	2.27	3.2
271	1	36	2	13	1	10	1	2	3	2	2	4	2.39	13	2.27	3.46
272	2	24	1	4	2	2	1	2	3	1	1	4	3.1	2	2.79	3.26
273	1	33	2	5	1	3	1	2	3	2	3	2	2.58	9	3.13	3.08
274	2	30	1	4	2	7	1	2	3	1	2	4	2.81	8	2.09	3.56
275	2	26	1	4	2	2	1	2	3	1	1	4	2.47	3	3.09	3.31
276	1	46	2	4	1	24	1	2	3	1	3	4	2.47	18	2.79	3.33
277	1	43	2	2	1	6	1	2	3	1	1	4	2.34	1	2.79	3.66
278	2	23	1	4	0	0	4	1	1	1	1	4	3.05	0	4.50	3.13
279	1	23	1	8	0	0	4	1	1	1	1	4	2.56	2	3.82	3.57
280	1	25	1	4	1	4	4	1	1	1	1	4	3.16	0	5.61	3.08
281	1	28	2	4	1	5	4	1	1	1	1	4	2.15	7	3.90	3.5
282	1	23	1	15	0	0	3	1	1	1	1	4	2.83	1	2.10	3.5
283	1	24	1	2	1	1	3	1	1	1	1	4	2.54	1	10.14	3.19
284	1	23	1	1	2	1	3	1	1	1	1	4	2.55	2	2.10	3.5
285	1	23	1	4	0	0	3	1	1	1	1	4	3.6	1	3.92	3.65
286	1	22	1	99	0	0	3	1	1	1	1	4	2.75	1	3.59	3.53
287	1	26	1	99	2	4	3	1	1	1	1	4	2.32	4	9.08	3.5
288	1	33	2	4	1	9	3	1	1	1	1	4	2.58	10	3.77	3.6
289	1	22	1	4	0	0	3	1	1	1	1	4	2.7	1	4.04	3
290	1	26	2	33	1	2	3	1	1	3	1	2	2.48	2	9.41	3
291	2	33	1	8	1	10	2	1	1	1	1	4	3.24	10	3.51	3.31
292	2	35	1	14	1	11	2	1	1	1	1	2	3.93	1	2.72	3.58
293	2	25	1	9	1	3	2	1	1	3	1	4	2.64	3	4.68	3.29
294	2	30	1	13	1	7	2	1	1	3	1	4	2.98	8	2.62	3.55

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B. Programming

A Statistical package (*Asp*) was used for this study. This is a suite of functions for graphing and analyzing statistical data. These programs are used with MALAB, that is a software package, which runs under Microsoft Windows. The m-file programs for producing the results are shows follows.

Figure 3.1 showns histograms and statistics of raw data for each variable, while Figure 3.2 shown the distributions of the categorical variables. The relations between each of the continuous determinants (age, experience, BA GPA, duration from BA to MA, total years of study) and the outcome are shown in Figure 3.9. The commands to produce these figures are called in a file *psu,m* as follows.

```
%file psu.m
getfile master
y= getnum;


%figure 3.9
relate 'col= 13 14 15 16' line=1 cor=1 font=8
% distrbute province into 3 groups
pro=y(:,4);
ok1=pro>=1 & pro<=5;
ok2=pro>=6 & pro<=15;
ok3=pro>=20;
pro(ok1)=1+0*pro(ok1);
pro(ok2)=2+0*pro(ok2);
pro(ok3)=3+0*pro(ok3);
% distrbute type of study into 2 groups
typ=y(:,9);
ok1=typ==1;
ok2=typ==2 |typ==3;
typ(ok1)=1+0*typ(ok1);
typ(ok2)=2+0*typ(ok2);
y1=y(:,1:3);
y2=y(:,5:8);
y3=y(:,10:16);
y=[y1 pro y2 typ y3];
putnum(y);
```

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```
%figure 3.1
describe hist=1 type=3 font=8
% distrbute age into 4 groups
ag=y(:,2);
ok1=ag>=20 & ag<=25;
ok2=ag>25 & ag<=30;
ok3=ag>30 & ag<=40;
ok4=ag>40;
ag(ok1)=1+0*ag(ok1);
ag(ok2)=2+0*ag(ok2);
ag(ok3)=3+0*ag(ok3);
ag(ok4)=4+0*ag(ok4);
% distrbute experience into 5 groups
ex=y(:,6);
ok0=ex==0;
ok1=ex>=1 & ex<=5;
ok2=ex>5 & ex<=10;
ok3=ex>10 & ex<=20;
ok4=ex>20;
ex(ok0)=0+0*ex(ok0);
ex(ok1)=1+0*ex(ok1);
ex(ok2)=2+0*ex(ok2);
ex(ok3)=3+0*ex(ok3);
ex(ok4)=4+0*ex(ok4);
% distrbute BA GPA into 3 groups
bsc=y(:,13);
gpa1=bsc<2.5;
gpa2=bsc>=2.5 & bsc<3;
gpa3=bsc>=3;
bsc(gpa1)=1+0*bsc(gpa1);
bsc(gpa2)=2+0*bsc(gpa2);
bsc(gpa3)=3+0*bsc(gpa3);
% distrbute duration from BA to MA into 4 groups
du=y(:,14);
ok1=du<=5;
ok2=du>5 & du<=10;
ok3=du>10 & du<=15;
ok4=du>15;
du(ok1)=1+0*du(ok1);
```

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```
du(ok2)=2+0*du(ok2);
du(ok3)=3+0*du(ok3);
du(ok4)=4+0*du(ok4);
% distrbute total years of study into 4 groups
year=y(:,15);
ok1=year<=3;
ok2=year>3 & year<=4;
ok3=year>4 & year<=6;
ok4=year>6;
year(ok1)=1+0*year(ok1);
year(ok2)=2+0*year(ok2);
year(ok3)=3+0*year(ok3);
year(ok4)=4+0*year(ok4);
y1=y(:,1);
y2=y(:,7:12);
newdata=[y1 ag y(:,3) pro y(:,5) ex y2 bsc du year y(:,16)];
putnum(newdata);
putfile('newdata')
cat=newdata(:,[2,4, 6, 13, 14, 15]);
putnum(cat);
fn=getfn
fn{1}='age group';
fn{2}='domicile';
fn{3}='experience';
fn{4}='BA GPA';
fn{5}='duration BA-MA';
fn{6}='total years';
putfn(fn);
lab=getlab;
lab{1}={'1 20-25' '2 26-30' '3 31-40' '4 40+'};
lab{2}={'1 near' '2 local' '3 others'};
lab{3}={'0 no' '1 1-5 year' '2 5-10 year' '3 10-20 year' '4 20+ year'};
lab{4}={'1 <2.5' '2 2.5-3' '3 3+'};
lab{5}={'1 <=5 year' '2 6-10 year' '3 11-15 year' '4 15+ year'};
lab{6}={'1 <3' '2 3-4' '3 4-6' '4 6+'}
putlab(lab);
%figure 3.2
describe hist=1 font=8
%end program
```

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In addition, before running file *psu.m.* Label may be added to a graph by specfying an additional argument in *getfile* function. These files contain information about the field names (*master.fn*), the title for display (*master.dn*), and, if any of the variables are categorical, data labels for the corresponding categories (*master.lab*). These files are as follows.

Master.dn

294 graduate students of PSU during the academic years 1993-1997

master.fn

gender
age
marital status
domicile
occupation
experience
faculty group
Study plan
Study Type
BA University
BA major
BA program
BA GPA
durationBA-MA
total years
MA GPA

master.lab

1, 1 male, 2 female
2, 1 20-25, 2 26-30, 3 31-40, 4 40+
3,1 single, 2 married
4,1 near, 2 local, 3 others
5,0 no work, 1 government, 2 individual
6, 0 no, 1 1-5 year, 2 5-10 year, 3 10-20 year, 4 20+ year
7,1 Mng,2 Nurs,3 Eng,4 Sci,5 Env,6 Nat,7 Argo,9 Ed,10 Hum,11 ScT
8,1 A, 2 B
9,1 full time, 2 part time
10, 1 regular university, 2 open university, 3 college, 4 others
11, 1 science, 2 humanities, 3 education

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12, 2 2 year, 4 4 year
13, 1 <2.5, 2 2.5-3, 3 3+
14, 1 <=5 year , 2 6-10 year , 3 11-15 year, 4 15+ year
15, 1 <3 , 2 3-4 , 3 4-6 , 4 6+

The box plots and 95% confidence intervals used to show the association between categorical determinant and a continuous outcome. These shown in figure 3.3 – 3.8. The data for used are stored in file *newdata.num,* which restructured by program *psu.m.* The commands to produce these figures are stored in file *boxplot.m*, as follow.

%program boxplot.m
```
getfile newdata
y=getnum;
% comparison between academic achievement and each determinant
setvar y=16 x=1;
compar type=3 test=1 font=9
setvar y=16 x=2;
compar type=3 test=1 font=9
setvar y=16 x=4;
compar type=3 test=1 font=9
setvar y=16 x=7;
compar type=3 test=1 font=8
setvar y=16 x=13;
compar type=3 test=1 font=9
setvar y=16 x=14;
compar type=3 test=1 font=9
setvar y=16 x=15;
compar type=3 test=1 font=9
%end program
```

A multiple regression analysis was used for fitting the model This involved starting with the model containing all the predictors and omitting in turn the least statistically significant predictors until all remaining determinants were statistically significant. File *stepwise.m* comprised the commands for this, as show follow.

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```
% file stepwise.m
getfile master
y=getnum;
% distrbute province into 3 groups
pro=y(:,4);
ok1=pro>=1 & pro<=5;
ok2=pro>=6 & pro<=15;
ok3=pro>=20;
pro(ok1)=1+0*pro(ok1);
pro(ok2)=2+0*pro(ok2);
pro(ok3)=3+0*pro(ok3);
% distrbute faculty into 3 groups
fac=y(:,7);
o1=fac==4 | fac==5;
o2=fac==1 | fac==3 | fac==7 | fac==11;
o3=fac==2 | fac==6 | fac==9 | fac==10;
fac(o1)=1+0*fac(o1);
fac(o2)=2+0*fac(o2);
fac(o3)=3+0*fac(o3);
% distrbute type of study into 2 groups
typ=y(:,9);
ok1=typ==1;
ok2=typ==2 |typ==3;
typ(ok1)=1+0*typ(ok1);
typ(ok2)=2+0*typ(ok2);
y1=y(:,1:3);
y2=y(:,5:6);
y3=y(:,8);
y4=y(:,10:16);
y=[y1 pro y2 fac y3 typ y4];
putnum(y);
lab=getlab;
lab{7}={'1 group 1' '2 group 2' '3 group 3'};
putlab(lab);

%figure 4.1 full model of multiple regression
setvar y=16 'x=1:15'
adjust show=1 font=7
```

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```
%figure 4.2 reduced model of multiple regression analysis
setvar y=16 'x=3 7 10 13 14 15'
adjust show=3 font=7
% all remaining determinant
y=y(:,[3 7 10 13 14 15 16]);
putnum(y)
fn=getfn
fn{1}='marital status';fn{2}='faculty group';
fn{3}='BA university';fn{4}='BA GPA';fn{5}='log2(duration+1)';
fn{6}='log2(total year)';fn{7}='MA GPA';
putfn(fn);
lab=getlab;
lab{1}={'1 single' '2 married'};
lab{2}={'1 group 1' '2 group 2' '3 group 3'};
lab{3}={'1 regular university' '2 open university' '3 college' '4 others'};
lab{4}=[ ];
lab{5}=[ ];
lab{6}=[ ];
lab{7}=[ ];
putlab(lab);
%not transform
setvar y=7 'x=1 2 3 4 5 6'
adjust show=3 font=8
%transform duration and total years by base 2 logarithms
y(:,5)=(log(y(:,5)+1))/log(2);
y(:,6)=(log(y(:,6)))/log(2);
putnum(y)

%figure 4.3
describe hist=1 type=3 font=8

%figure 4.4
setvar y=7 'x=1 2 3 4 5 6'
adjust show=3 font=8
 %end program
```

Program *combine.m* is used for combining categorical variables, that had approximately the save coefficients. In this case, the categorical of university in bachelor's degree and categorical of faculty were combined, the result show in Figure

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4.5. The interaction effect in the multiple regression analysis model was considered, as shown in Figure 4.6. The command file is as follows.

```
%program combine.m
getfile master
y=getnum;
% distrbute province into 3 groups
pro=y(:,4);
ok1=pro>=1 & pro<=5;
ok2=pro>=6 & pro<=15;
ok3=pro>=20;
pro(ok1)=1+0*pro(ok1);
pro(ok2)=2+0*pro(ok2);
pro(ok3)=3+0*pro(ok3);
% combination faculty group 1&2
fac=y(:,7);
o1=fac==4 | fac==5;
o2=fac==1 | fac==3 | fac==7 | fac==11;
o3=fac==2 | fac==6 | fac==9 | fac==10;
fac(o1)=1+0*fac(o1);
fac(o2)=1+0*fac(o2);
fac(o3)=3+0*fac(o3);
% combine regular U. with open U. and collage with other
u=y(:,10);
o1=u==1 | u==2;
o2=u==3 | u==4;
u(o1)=1+0*u(o1);
u(o2)=2+0*u(o2);
%restructure data
y1=y(:,1:6);
y2=y(:,8:9);
y3=y(:,11:16);
y=[y1 fac y2 u y3];
putnum(y);
y=y(:,[3 7 10 13 14 15 16]);
putnum(y)
fn=getfn
fn{1}='marital status';fn{2}='faculty group';
fn{3}='BA university';fn{4}='BA GPA';fn{5}='duration';
```

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```
fn{6}='total years';fn{7}='MA GPA';
putfn(fn);
lab=getlab;
lab{1}={'1 single' '2 married'};
lab{2}={'1 group 1&2' '2 group 3'};
lab{3}={'1 regular & open' '2 college & other'};
lab{4}=[ ];
lab{5}=[ ];
lab{6}=[ ];
lab{7}=[ ];
putlab(lab);
%transform duration and total years by base 2 logarithms
y(:,5)=(log(y(:,5)+1))/log(2);
y(:,6)=(log(y(:,6)))/log(2);
putnum(y)

%figure 4.5 model with combined faculty and BA university
setvar y=7 'x=1 2 3 4 5 6'
adjust show=3 font=8

%figure 4.6 model with interaction
adjust show=1 font=9 int=[4 5]
%end program
```

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