STAT3032 SURVIVAL MODELS

TUTORIAL WEEK EIGHT

Question One

We are interested in the rate at which females aged 18 years experience their first accident while undertaking part-time work. The table below contains information collected on 10 females.

Individual	Age started part-time work	Age at first accident	Age at time of analysis
1	17.4	17.8	20.3
2	17.0	18.2	20.4
3	17.9	19.1	19.4
4	18.1	18.2	20.5
5	17.0	20.0	21
6	17.6	17.9	18.4
7	18.1	NA	21
8	17.1	NA	20.1
9	17.5	19.6	19.7
10	18.1	18.7	18.8

a_i b_i v_i δ_i

1 0.2

$d=3$

$v=5.8$

$\hat{\lambda} = \frac{3}{5.8} = 0.517$

$SE = \sqrt{\frac{3}{5.8^2}} = 0.299$

Estimate the rate of first accidents among 18 year olds in part-time work. Please, provide a standard error for your estimate.

Question Two

Information on survival after an operation for a particular condition are provided in the table below. The study ran for the three year period 1997-1999. In this table, the value x corresponds to the time since the operation (at the time of entry into the study). For example, when patient 1 entered the study it had been 0.5 years since their operation.

Patient	Entry	x	Died
1	1997.5	.5	-
2	1998.4	0	1999.6
3	1997	0	1999.5
4	1999.1	.3	1999.9
5	1997.2	.3	1997.8
6	1997	0	1997.7
7	1997.8	1.4	1998.2
8	1997.5	0	-
9	1998.5	0	-
10	1999.1	2	-
11	1999.2	.3	-

12	1998.7	1.9	1999.2
13	1998.8	1.5	1999.1
14	1997	1.6	-
15	1999.5	0	-

Estimate the transition intensity in the second year post operation. Also, estimate the probability of survival to 2.5 years post operation, given survival to 2 years post operation.

Question Three

The table below lists the amount of time that a group of children (aged 3 years) in daycare spent participating in certain activities. The values "A" through "F" represent different activities. For example, "A" represents playing, "B" sleeping etc. It is assumed that each morning children will start in state A. From the table we see that over the period of observation 2820 hours were spent playing and there were 430 transitions from state playing to state sleeping.

		Transitions					
Activity	*Waiting time*	*A*	*B*	*C*	*D*	*E*	*F*
A	2820	NA	430	680	58	11	NA
B	960	210	NA	NA	NA	210	90
C	870	95	NA	NA	NA	180	60
D	430	NA	90	80	NA	NA	NA
E	1230	500	NA	NA	NA	NA	100
F	0	NA	NA	NA	NA	NA	NA

Note: Transitions with an "NA" mean that transitions between the two-states is not possible.

(a) Estimate all the transition intensities. Please provide 90% confidence intervals for the transition intensities from state C.

(b) What is the estimated probability that a child will move from state A within 1.5 hours? That is, what is the probability that a child will play for a period of less than 1.5 hours.

(c) Estimate the mean time that a child who has just started playing will continue to play until moving to another state.

estimate the probability of survival to 1.5 years post operation, given survival to 1 year post operation