Date:

DSE-A-2: Survival Analysis
(Problem Set on Kaplan-Meier Method)

1. Suppose that the following remission durations are observed from 10 patients with solid tumors. Six patients relapse at 3.0, 6.5, 6.5, 10, 12, and 15 months; 1 patient is lost to follow-up at 8.4 months; and 3 patients are still in remission at the end of the study after 4.0, 5.7, and 10 months.

(a) Calculate the Kaplan-Meier estimates for the survival function S(t).

(b) Make a plot of the survival function based on the estimates obtained in part (a).

(c) Find out the estimate of the variance of estimate of the survival function.

2. Thirty melanoma patients were studied to compare the immunotherapies BCG (Bacillus Calmette-Guerin) and Corynebacterium parvum for their abilities to prolong survival time. The survival time are given below, where "+" denotes a censored value.

BCG

33.7+	3.9	10.5	5.4	19.5	23.8+	7.9	16.9+	16.6+	33.7+	17.1+

Corynebacterium parvum

8.0	26.9+	21.4+	18.1+	16.0+	6.9	11.0+	24.8+	23.0+	8.3
10.8+	12.2+	12.5+	24.4	7.7	14.8+	8.2+	8.2+	7.8+	

(a) Compute and plot the product limit estimates of the survival functions of the two treatment groups.

(b) Estimate the variance of the estimate of the survival function for every uncensored observation.

(c) Estimate the median survival times of the two groups.