Homeworks for 29.9.1997 (David V. Cortizo)

1. (Problem 2.3 from the book) With the Divisibility Condition in force, give an example illustrating that the throughput of a class can decrease when the knapsack capacity increases by one unit. With the Divisibility Condition *not* in force, give an example illustrating that the throughput of a class can decrease when the knapsack capacity increases by the size of the widest customer.

2. (Problem 2.4 from the book) Suppose we operate an ATM system in the statistical multiplexing mode with linear policy $\mathbf{f}$. Let $b_k^e,\ k \in \mathcal{K}$, denote the associated effective bandwidths. Suppose we then replace $\mathbf{f}$ with a new linear policy $\overline{\mathbf{f}}$ with effective bandwidths $\tilde{b}_k = ab_k^e,\ k \in \mathcal{K}$, where $0 < a < 1$. Show that the average link utilization increases.