2009-01-26 Questions 384, HW 1

```plaintext
do switch handles IP
    init_stack sets up return address to start thread
    
    to start first thread
    int tmp
    dio_switch(&tmp, &stack-1)

q 9 i = read_term(buffer)

thread 0
  getline()
  getline()
  switch
    read_term
```

[Diagram showing telnet, homework, telnet nodes with connections and numbers]
Queuing Theory

$\text{Rate } \lambda \rightarrow \text{arrivals} \rightarrow 0 \rightarrow \text{departures}$

$\text{waiting time} \rightarrow \text{rate } \lambda \rightarrow \text{servers}$

$n = \# \text{ elements in system} = \# \text{ jobs}$

Little's formula: $E(n) = \lambda E(w)$

Consider period where arrivals = departures

$T = 6$, arrivals = 3 departures

$n = 7$

$E(n) = \frac{\text{sum of times}}{T} = \frac{\sum x_i}{T} = \lambda \cdot w$

$\lambda = \frac{\text{sum of times}}{T} = \frac{\sum x_i}{T} = \frac{\text{sum of times}}{T}$

$w = \frac{n}{N}$
$M/M/1$ queue

arrival, service, # servers

distribution, time distribution

$M$: memoryless (Poisson, exponential)

$G$: general

$D$: deterministic

$M/M/m$

$M/M/1$: discrete Markov process

- states, future behavior is determined completely by current state

birth/death process

$P_0$ (no jobs in system) = $1 - P$

$P_n = (1-P)p^n$

$E(n) = P/(1-P)$

arrival rate: $\lambda$

mean inter arrival time: $1/\lambda$

service rate: $\mu$

mean service time: $1/\mu$

load factor $P = \frac{\lambda}{\mu}$

mean time for a job = $E(n) \cdot E(S) + E(S)$

$$\frac{1}{(1-P)} \frac{1}{\mu} + \frac{1}{\mu} = \frac{1}{(1-P)}$$