ECE1150 ~~ASSIGNMENT1~~ YINHAO QIAN

```
answer = @(num,unit) fprintf("ANSWER: %f [%s]\n",num,unit);
```

Q1_A

```
clearvars -except answer
B_service = 5e6;%[bits/s] service bitrate per channal
M_service = 100e3;%[bits] file size per message
T_t_service = M_service/B_service;%[s] service time per channel
mu_service = 1/T_t_service;%[1/s] service rate total
lambda_arrival_total = 20;%[messages/s] mean arrival rate total
lambda_arrival = lambda_arrival_total/2;%[messages/s] mean arrival rate per channel
U = lambda_arrival/mu_service;%[] utilization
N_q = U/(1-U);%[] average #packets in queue
D=N_q/lambda_arrival;%[s] mean delay
answer(D,"s");
```

```
ANSWER: 0.025000 [s]
```

Q1_B

```
clearvars -except answer
B_service = 10e6;%[bits/s] service bitrate per channal
M_service = 100e3;%[bits] file size per message
T_t_service = M_service/B_service;%[s] service time per channel
mu_service = 1/T_t_service;%[1/s] service rate total
lambda_arrival = 20;%[messages/s] mean arrival rate per channel
U = lambda_arrival/mu_service;%[] utilization
N_q = U/(1-U);%[] average #packets in queue
D=N_q/lambda_arrival;%[s] mean delay
answer(D,"s");
```

```
ANSWER: 0.012500 [s]
```

COMPARE RESULTS

Since Case #1 has slightly longer delay than Case #2, not splitting the tranmittor (Case #2) could gives users better experience. However, seperating tranmittors (Case #1) increases reliabilities since if one transmittor is broken, then another one could still, although a little bit slower, transmit data.