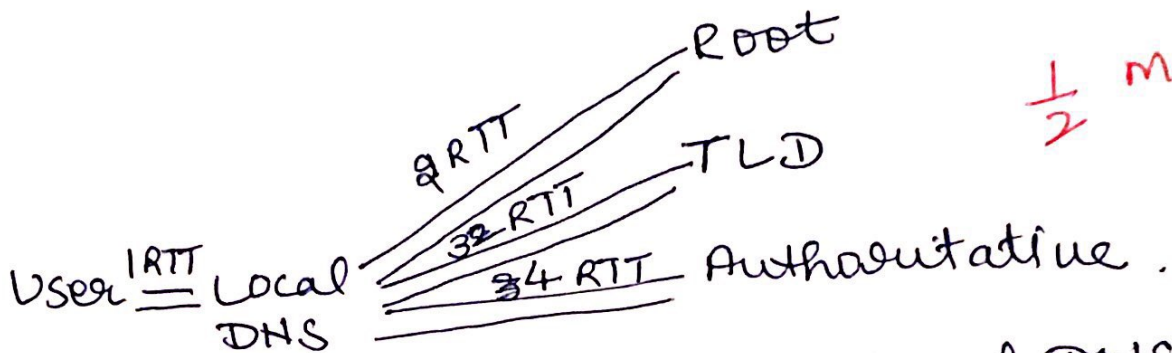


Solution 4; Given base file = 1 Size = 100 B
 Embedded obj = 10
 prt size = 100 Bytes

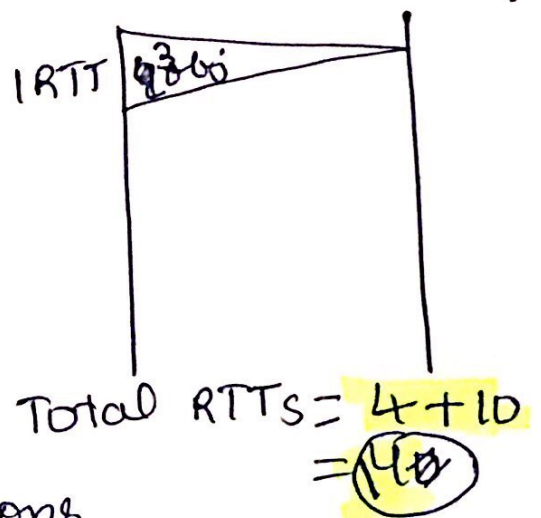
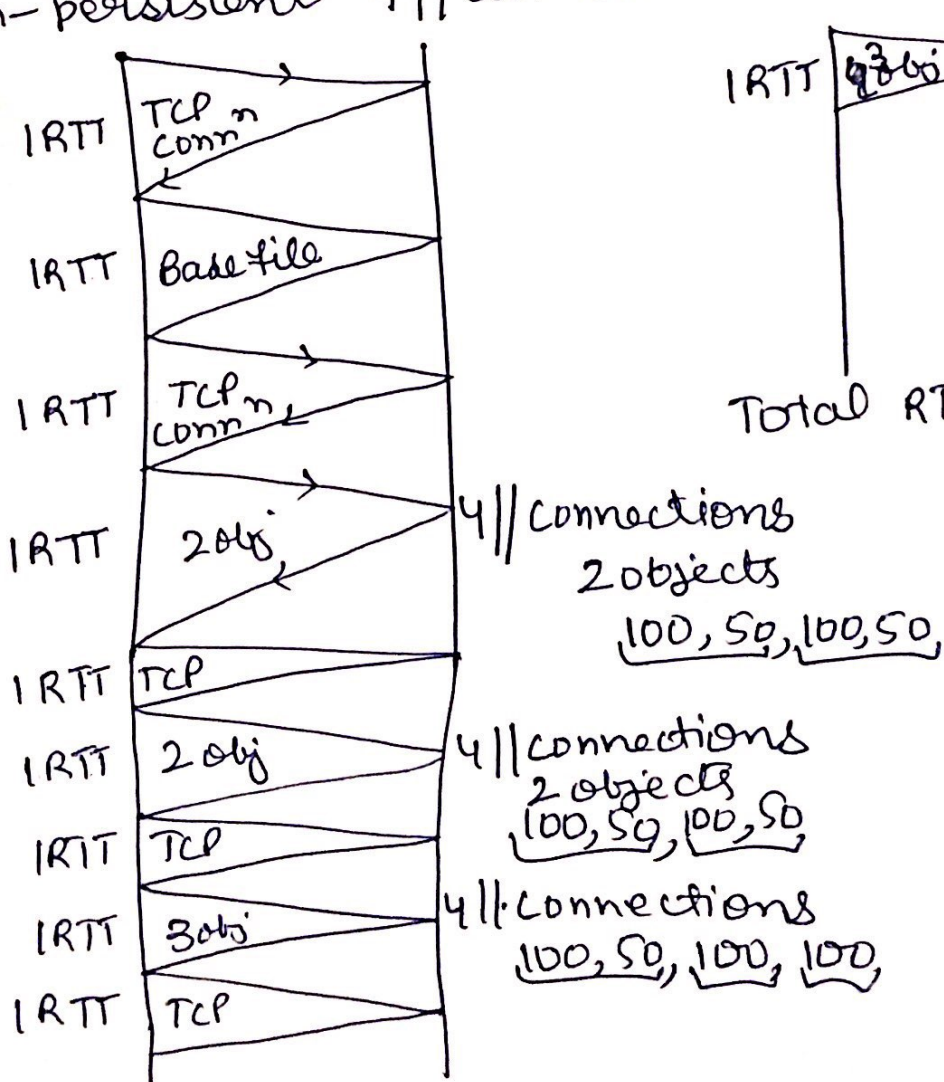
obj 1 to obj 5 = 150 B
 obj 6 to obj 10 = 100 B

a)



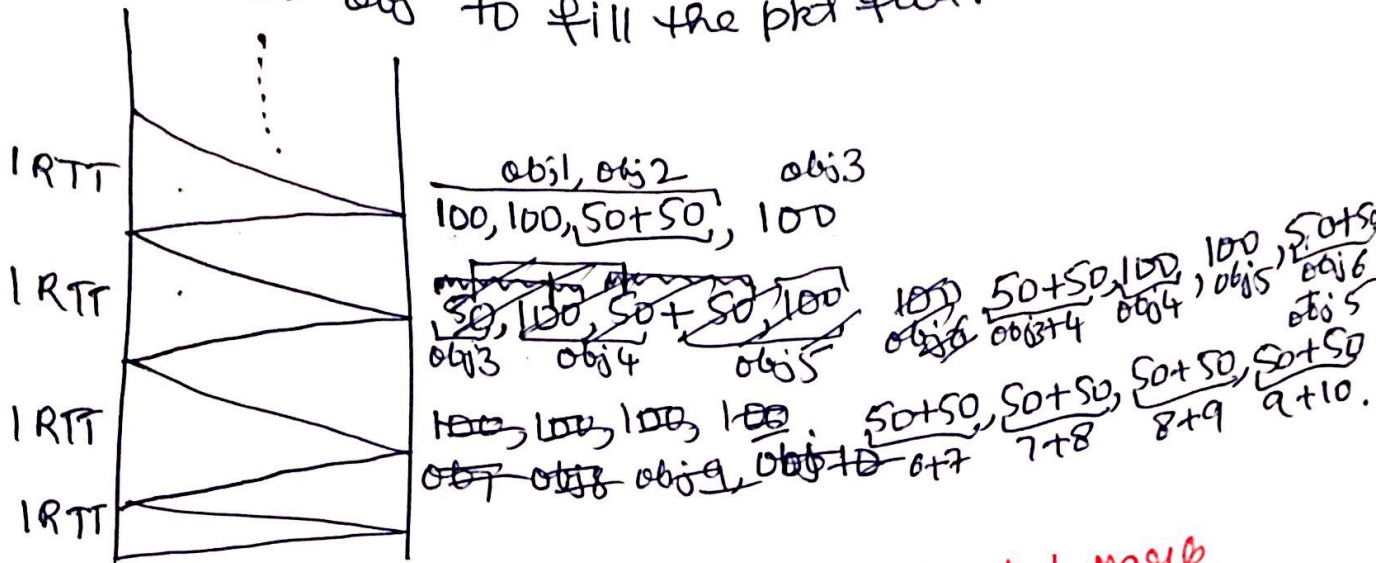
Local DNS hit

a) Non-persistent 4 // connections



2 1/2 marks

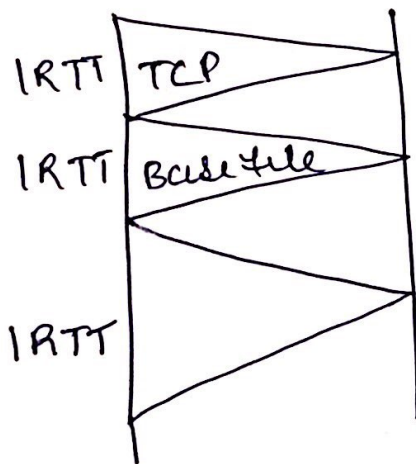
Students may merge 50 bytes of one obj with another obj to fill the pkt full.



then total RTTs
 $= 4 + 12$
 $= 16$

deduct $\frac{1}{2}$ mark
 for this
 approach
 [1 1/2 marks]

(b) Persistent with pipelining.



1 mark

Window size was not given
 \therefore all objs can be received
 in 1 RTT.

[on case students attempt
 some other way pl discuss]

Solution 2:- Given

$$\begin{aligned}\text{Cache hit rate} &= 0.65 \\ \text{Reqs/sec} &= 20 \\ \text{Obj size} &= 15000 \text{ bits} \\ L_1 \text{ Rate} &= 10 \times 10^6 \text{ bps} \\ L_2 (\text{Access Link}) \text{ Rate} &= 2 \times 10^6 \text{ bps} \\ \text{RTT (Internet delay)} &= 4 \text{ s}\end{aligned}$$

$$\text{Avg Access delay (AAD)} = \frac{\Delta}{1 - \Delta\beta}$$

$$\Delta = \frac{L}{R} = \frac{15000}{2 \times 10^6} = \frac{7.5}{1000} = 0.0075 \quad \text{--- 1 mark}$$

Not Required.

$$\beta = 20$$

$$\begin{aligned}\therefore \text{AAD} &= \frac{0.0075}{1 - 0.0075 \times 20} = \frac{0.0075}{1 - 0.15} = \frac{0.0075}{0.85} \\ &= 0.0088 \text{ (approx)}\end{aligned}$$

$$\begin{aligned}\text{Total Avg Resp Time} &= 0.0088 + 4 \\ &= 4.0088\end{aligned}$$

$$\text{Reqs/sec in case of cache Miss} = (20) \times (1 - 0.65) = 7$$

$$\text{AAD}' = \frac{0.0075}{1 - 0.0075 \times 7} = \frac{0.0075}{0.9475} = 0.0079 \quad \text{--- 1 mark (approx)}$$

$$\begin{aligned}\text{Total Avg Res Time} &= 0.0079 + 4 \\ &= 4.0079 \quad \text{--- 1 mark}\end{aligned}$$

In case of Cache Hit (Assuming zero resp time if obj found in cache)

$$\begin{aligned}\text{Total Response Time} &= 0.65 \times 0 + (1 - 0.65) \times 4.0079 \\ &= 1.402765 \text{ s.} \quad \text{--- 2 marks}\end{aligned}$$