Solution for Chapter 7: "Multimedia Networking"

Problem 1

1.a) Option 1	Package 1, package 4, package 5, package 6
1.b) Option 3	Package 1, package 2, package 3, package 4, package 5, package 6
1.c) Option 2	2 packages (e.g package 3 and 4 are in the buffer before time of playing package 3, package 4 and 5 are in the buffer before time of playing package 4, and package 5 and 6 are in the buffer before time of playing package 5)
1.d) Option 3	3 Δ in order for package 7 to arrive before its playing time.

Problem 2

2.a) Q/(r-x).	Playout starts when we have received Q bits, and our buffer are losing (r-x) bits per time unit.
2.b) Q/x	Need Q bits before starting playout. We receive x bits per time unit
2.c) Q/x + (B-Q)/(x-r)	Q/x is the time it takes before playout starts. (B-Q) is the remaining storage capacity in the buffer, and (x-r) is the number of bits received per time unit.

Problem 3

3.a) (N-1)*r, r	Others send their own stream to the call initiator, r. Call initiator combines them with its own, and sends this combined stream to the other N-1, at a total rate of (N-1)*r.
3.b) r, r	Everyone have to send their stream to the central server.
3.c) (N-1)*r, (N-1)*r	Everyone have to send their stream to everyone else.