ECE 363 Spring 2026 Assignment 4 Solutions

1. we have an IP payload of 920 bytes

assume a 20 byte header

the first link can carry IP packets up to size

1024 - 14 = 1010 bytes

so there will be no fragmentation

the second link can carry IP packets up to size

512 - 8 = 504 bytes

so there will be fragmentation

- there may be up to 484 bytes of data in an IP packet

but fragments must carry a multiple of 8 bytes of data (except the last fragment

thus the first fragment will carry 480 bytes of data and the second

fragment will carry 440 bytes

the third link can carry IP packets up to size

512 - 12 = 500 bytes

so no further fragmentation is necessary

Link A-R1

length = 940 ID = x DF = 0 MF = 0 offset = 0

Link R1-R2

(1) length = 500 ID = x DF = 0 MF = 1 offset = 0
(2) length = 460 ID = x DF = 0 MF = 0 offset = 60

Link R2-B

(1) length = 500 ID = x DF = 0 MF = 1 offset = 0
(2) length = 460 ID = x DF = 0 MF = 0 offset = 60

2 they can be aggregated to

57.6.96.0/19

3. it is sufficient to add one new table entry

29.18.60.0/22

for the new block

if an incoming packet matches both

29.18.0.0/17 and 29.18.60.0/22

the longer prefix is chosen

4 the aggregate address range from Router A is

37.62.0.0/16

the aggregate address range from Router B is

37.60.0.0/15

if router C's routing table consists of only these two entries

packets with an address in the range

37.62.64.0/18

are incorrectly forwarded to router A

- the problem is that the aggregation creates a shorter prefix
- one solution to this problem is to only aggregate contiguous ranges

5. computing the cheapest path to each destination from D gives costs

To	Cost	Line
A	8	C
B	5	F
C	3	C
D	0	—
E	6	C
F	4	F

6. pick a route using the shortest path
now remove all the lines used in this path
and run the shortest path algorithm again
the second path will be able to survive
the failure of any line in the first path
and vice versa

7. as far as the receiver is concerned
this is part of a new datagram since
no other parts of it are known
it will therefore be queued until the
other fragments show up
if they do not, this fragment will time out
too