CS & IT ENGINEERING

Computer Network

1500 Series

Lecture No.- 09

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Recap of Previous Lecture

Topic

Topic

Questions Practice

Topics to be Covered

Topic Common Data Questions

Topic

Suppose two nodes, A and B, are attached to opposite ends of an 1200m cable, and that they each have one frame of 1,500 bits (including all headers and preambles) to send to each other. Both nodes attempt to transmit at time t=0. Suppose there are four repeaters between A and B, each inserting a 40-bit delay. Assume the transmission rate is 100 Mbp, and CSMA/CD with backoff intervals of multiples of 512 bits times is used. After the collision, A draws K=0 and B draws K=1 in the exponential backoff protocol. Ignore the jam signal in this case.

#Q. What is the one-way propagation delay (including repeater delays) between A and B in micro seconds? Assume the signal propagation speed is $2*10^8$ m/sec.

______

#Q. At what time (in micro seconds) is A's packet completely delivered at B?

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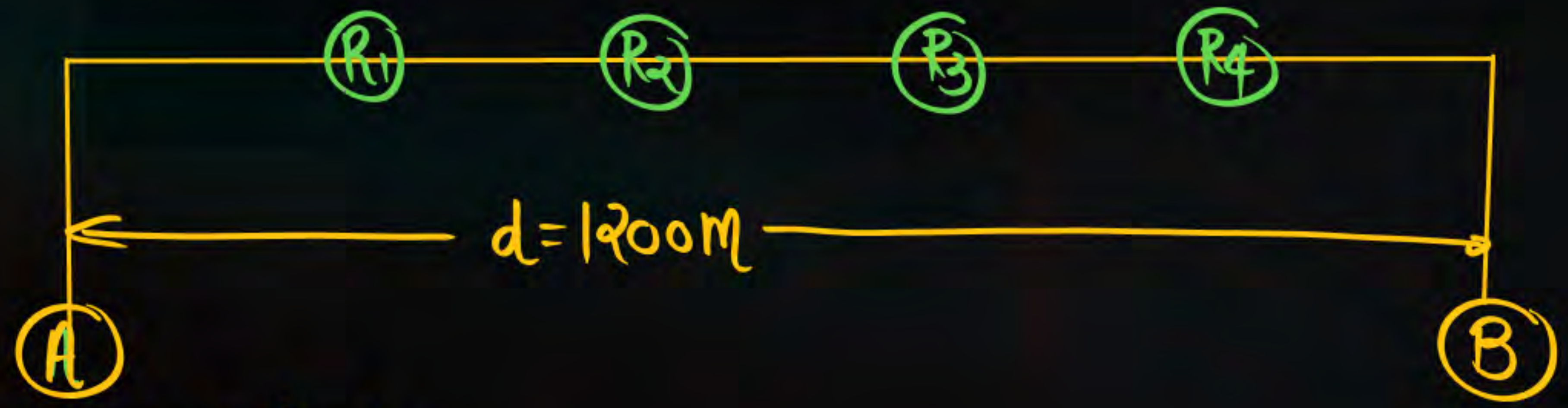
#Q. At what time (in microsec) 'A' retransmission 1st bit will reach at 'B'

$15.2+7.6=22.8$



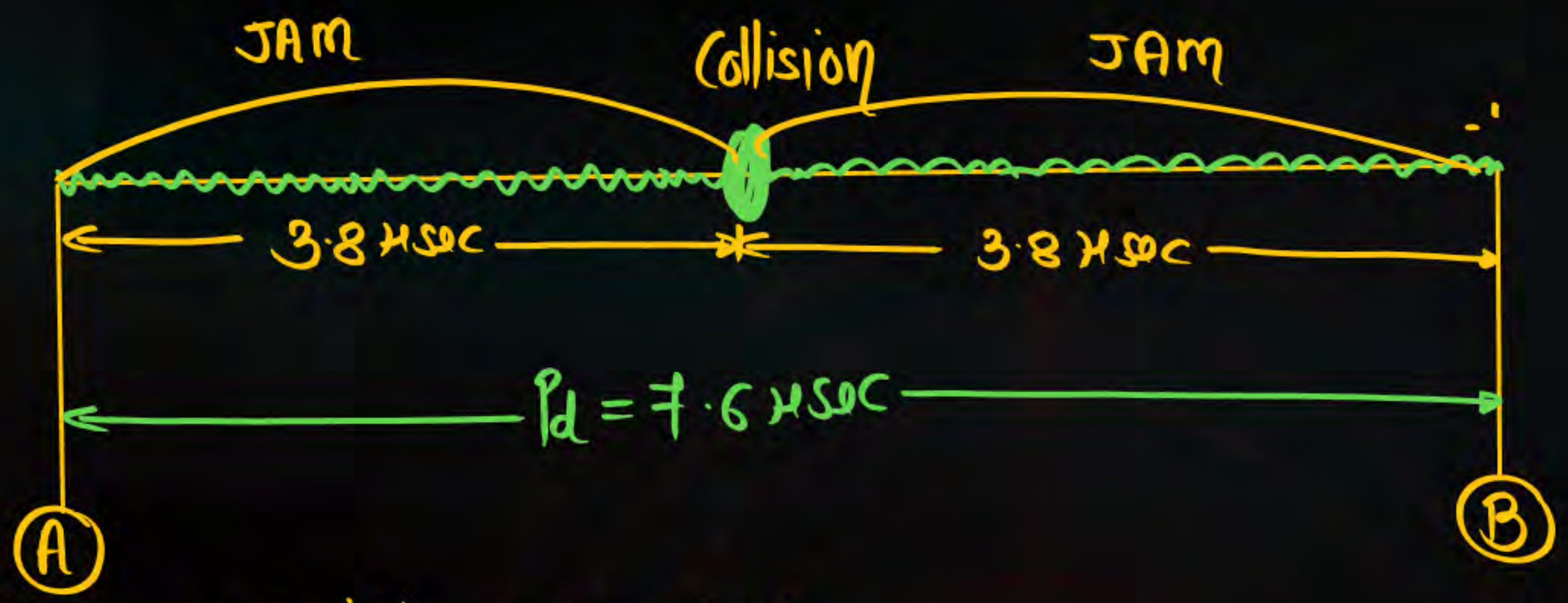
$v = 2*10^8$ m/sec

P_d (including Repeater delay) $= \dfrac{d}{v}$ + Repeater delay

$= \dfrac{1200 \text{ m}}{2*10^8 \text{ m/sec}} + \dfrac{4*40 \text{ bit}}{100*10^6 \text{ bits/sec}}$

$= 6*10^{-6}$ sec $+ 1.6*10^{-6}$ sec

$= 6\,\mu$sec $+ 1.6\,\mu$sec $= 7.6\,\mu$sec



$T_d = \frac{\text{Pkt size}}{\text{Bandwidth}}$

$= \frac{1500 \text{ bits}}{100 * 10^6 \text{ bits/sec}}$

$= 15 * 10^{-6} \text{ sec} = 15 \, \mu\text{sec}$

At $t = 0$ Both 'A' and 'B' starts

At $t = 3.8 \, \mu\text{sec} \longrightarrow$ Both 'A' and 'B' data collide

At $t = 7.6 \, \mu\text{sec} \rightarrow$ Both 'A' and 'B' detect the collision

$K = 0$

$WT = P_d = 7.6 \text{ sec}$

At $t = 7.6 + 7.6 = 15.2 \, \mu\text{sec}$ 'A' start retransmitting the data

$K = 1$

$WT = K * \text{slot duration}$

$WT = 1 * 512 \text{ bits}$

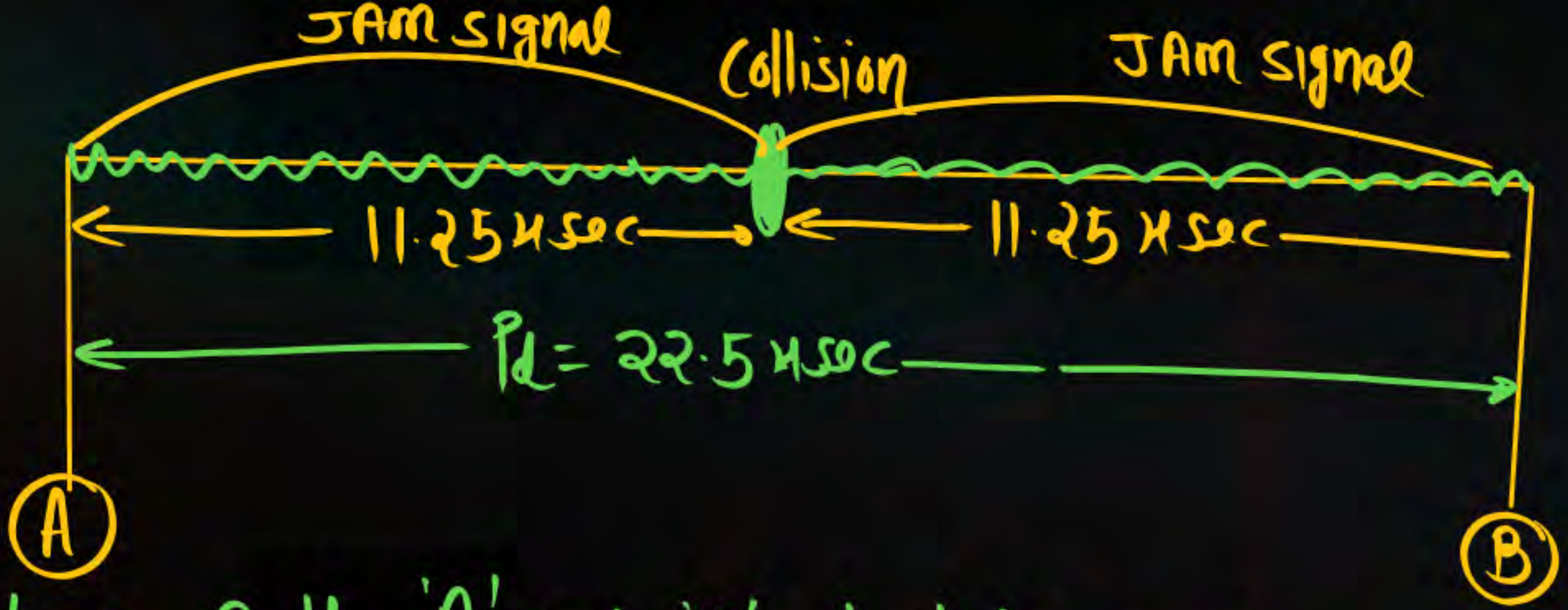
At $t = 15.2\,\mu sec + 15\,\mu sec = 30.2$ 'A' Finished its transmission

At $t = 30.2 + 7.6\,\mu sec = 37.8\,\mu sec$ 'A''s Packet completly delievered at 'B'

Suppose nodes A and B are on the same Ethernet bus, and the propagation delay between the two nodes is 225-bit times. Suppose both A and B send frames of 1,500 bits (including all headers and preambles) exactly at the same time, the frames collide, and then A and B choose different values of K (A = 0 and B = 1) in the CSMA/CD algorithm. Assume the transmission rate is 10 Mbps; CSMA/CD with backoff intervals of multiples of 512-bits is used. If a node detect collision, then it sends a 48-bit jam signal of inform other nodes. Assuming no other node is active and transmission time of a data frame is negligible

#Q. At what time (in microseconds) does A begin retransmission? ______________

#Q. At what time (in microseconds)A's packet completely delivered at B?__________



$P_d = \frac{225 \text{ bit}}{10 * 10^6 \text{ bits/sec}}$

$= 22.5 * 10^{-6} \text{ sec} = 22.5 \ \mu\text{sec}$

At $t=0$ Both 'A' and 'B' start transmitting data

At $t = 11.2 \ \mu\text{sec}$ Both 'A' and 'B' data Pkt collide

At $t = 11.25 + 4.8 + 11.25 = 27.3$ Both 'A' and 'B' detect collision

$K=0$ $K=1$

$WT = P_d = 22.5 \ \mu\text{sec}$

At $t = 27.3 + 22.5 = 49.8 \ \mu\text{sec}$ 'A' start its retransmission

$T_d(\text{JAM signal}) = \frac{\text{JAM signal size}}{\text{Bandwidth}}$

$= \frac{48 \text{ bits}}{10 * 10^6 \text{ bits/sec}}$

$= 4.8 * 10^{-6} \text{ sec}$

$= 4.8 \ \mu\text{sec}$

At $t = 49.8 + 150 = 199.8\ \mu sec$ 'A' Finish its transmission

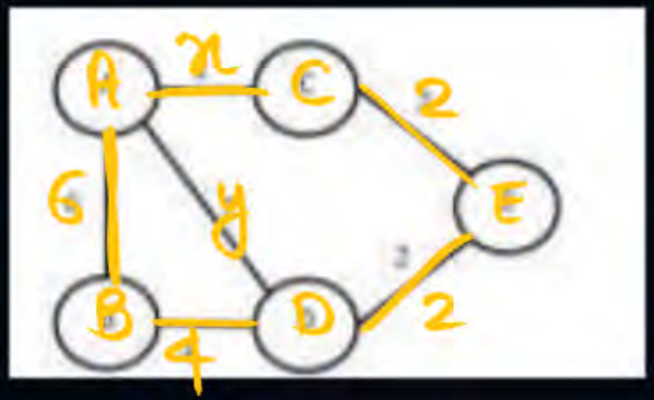
At $t = 199.8 + 22.5 = 222.3$ 'A's Pkt completly delivered at 'B'

$$T_d(Pkt) = \frac{Pkt\ size}{Bandwidth}$$

$$= \frac{150\cancel{0}\ bits}{1\cancel{0} * 10^6\ bits/sec}$$

$$= 150 * 10^{-6} sec = 150\ \mu sec$$

Consider the following network



$\cancel{A} + x + y < \cancel{A} + 2 + 2$

$\boxed{x + y < 4}$

Which of the following condition must be satisfied to ensure that traffic from B to C will always Flow through node A?

(a) $x > 4$

(b) $y + x < 6$

(c) $y + x < 4$

(d) $x < 4$

The network uses a Distance Vector Routing protocol to compute the distances and next hops between different node pairs. Given the initial distance vector table after first round of distance vector exchange

MCQ

Information Stored at Node	Distance to Reach Node						
	A	B	C	D	E	F	G
A	0	2	7	∞	∞	3	∞
B	2	0	4	∞	∞	∞	∞
C	7	4	0	∞	2	∞	∞
D	∞	∞	∞	0	10	1	∞
E	∞	∞	2	10	0	∞	2
F	3	∞	∞	1	∞	0	1
G	∞	∞	∞	∞	2	1	0

Each distance vector is the distance of the best known path at that instance to nodes, A to G, where the distance to itself is 0. Also, all links are symmetric and the cost is identical in both directions. In each round, all nodes exchange their distance vectors with their respective neighbours. Then all nodes update their distance vectors. In between two rounds, any change in cost of a link will cause the two incident nodes to change only that entry in their distance vectors. The distance vector table entries of node A after second round of distance vector exchange with its neighbours is

	A	B	C	D	E	F	G
(a)	0	2	7	4	∞	3	4
(b)	0	2	6	4	9	3	4
(c)	0	2	6	4	∞	3	4
(d)	0	2	6	4	8	3	4

At A

'A' Rcvd DV From B, C, F

From B

2
0
4
∞
∞
∞
∞

AB=2

0+2=2
4+2=6
∞+2=∞
∞+2=∞
∞+6=∞

From C

7
4
0
∞
2
∞
∞

AC=7

4+7=1
0+7=7
∞+7=∞
2+7=9
∞+7=∞
∞+7=∞

From F

3
∞
∞
1
∞
0
1

AF=3

∞+3=∞
∞+3=∞
1+3=4
∞+3=∞
0+3=3
1+3=4

New Routing table OF 'A'

Des.	Dis.	NH
A	0	A
B	2	B
C	6	B
D	4	F
E	9	C
F	3	F
G	4	F

NAT

How many statements about link state routing protocol is/are TRUE?

1. Routing messages from a router should be forwarded to all other routers in its area. (True)

2.Routers build a complete picture of the whole network and compute shortest LS paths locally. (True)

3. Suffers from the "count to infinity" problem. DVR suffers from count to infinity Not LSR (False)

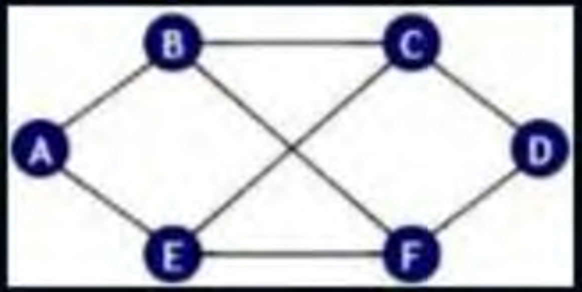
4.Does not prevent routing loops. DVR does Not Prevent Routing loops Not LSR (False)

5.Typically uses Dijkstra's shortest path algorithm. (True)

____

[MCQ]

Consider the following network, which utilize the Distance vector routing:



F New Routing table

Dest.	Dis.	NH
A	9	B
B	6	B
C	8	
D		
E		
F	0	F

Router F has the following routing table:
A: ∞, B: 6, C: ∞, D: 3, E: 5, F: 0
The following vectors have just come in to router F:
From B: A: 3, B: 0, C: 8, D: 12, E: 6, F: 2
From D: A: 16, B: 12, C: 6, D: 0, E: 9, F: 10
From E: A: 7, B: 6, C: 3, D: 9, E: 0, F: 4
What is F's new routing table?

(a) A: ∞, B: 6, C: ∞, D: 3, E: 5, F: 0
(b) A: 9, B: 6, C: 9, D: 3, E: 5, F: 8
(c) A: 9, B: 6, C: 8, D: 3, E: 5, F: 0
(d) A: 9, B: 6, C: 9, D: 3, E: 5, F: 0

At F

F Rcvd DV From B, D, E

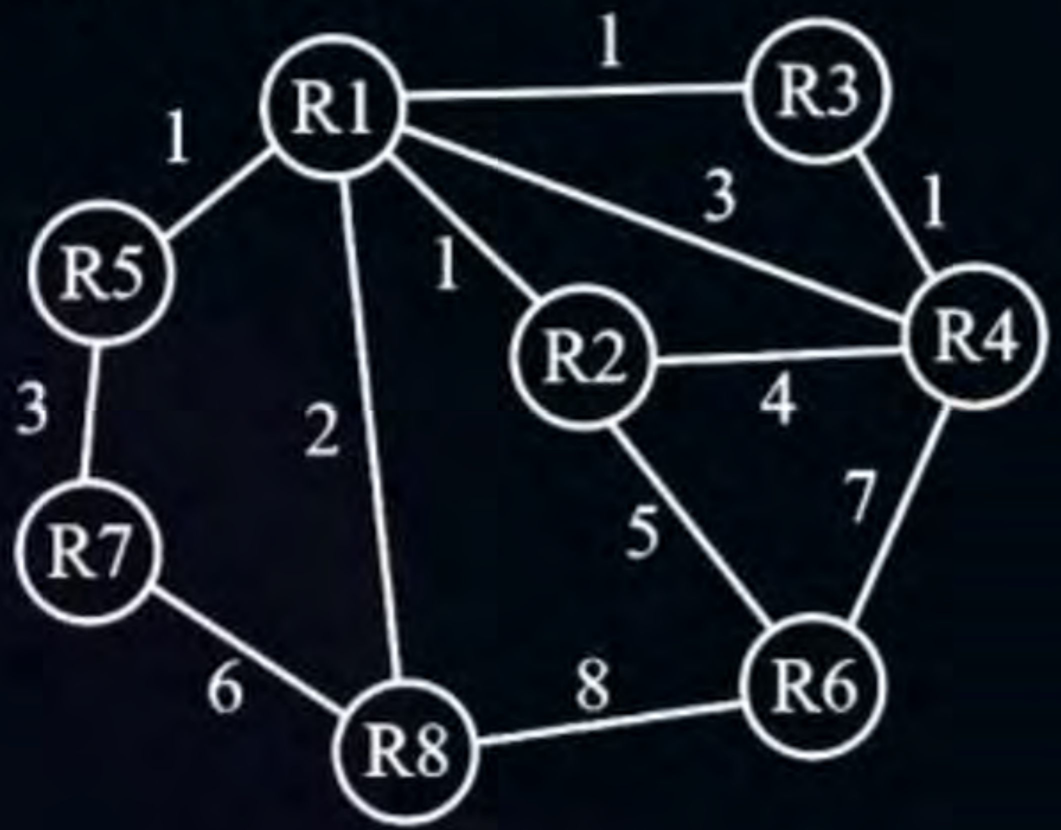
From B	From D	From E
3	16	7
0	12	6
8	6	3
12	0	9
6	9	0
2	10	4

FB=6 FD=3 FE=5

8+6=14 6+3=9 3+5=8

[MCQ]

Consider a network with 8 routers R1 to R8 connected with links having weight shown in the following diagram:



Routing table of R_2

Dest	Dis	NH
R_1	1	
R_2	0	
R_3	2	
R_4		
R_5		
R_6		
R_7		
R_8		

All the routers uses the distance vector based routing algorithm to update their routing tables. Each router starts with its routing table initialized to contain an entry for each neighbour with the weight of the respective connecting link. After all the routing tables stabilize, then what will be the routing table at router R2?

A

R1	R2	R3	R4	R5	R6	R7	R8
1	0	5	4	2	5	5	3

B

R1	R2	R3	R4	R5	R6	R7	R8
1	0	2	3	2	5	5	3

C

R1	R2	R3	R4	R5	R6	R7	R8
1	0	5	4	2	5	4	3

D

R1	R2	R3	R4	R5	R6	R7	R8
1	0	4	5	2	5	4	3

Consider the following statements about the protocols:

S_1: HTTP and FTP both are In-band protocol

S_2: HTTP is stateful and FTP is stateless protocol

S_3: HTTP is stateless but FTP is stateful protocol

S_4: HTTP and FTP both are out of band protocol

Which of the above statements are correct?

A. S_1

B. S_2

C. S_3

D. S_4

stateless	statefull
DNS	POP
SMTP	IMAP
HTTP	FTP

In-Band	out of Band
DNS, SMTP, HTTP, IMAP POP	FTP

2 mins Summary

Topic One

Topic Two

Topic Three

Topic Four

Topic Five

Common Data Questions

THANK - YOU