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Chapter 1 : Exercise 1.2.3

EX1: False Counterexample:

	1st	2nd	3rd
X	A	B	C
Y	B	A	C
Z	A	B	C

	1st	2nd	3rd
A	Y	X	Z
B	X	Y	Z
C	X	Y	Z

in the above instance, there's no such pair (m, w) such that m is ranked first in w's preference and vice versa. So there's no such stable matching.

EX2 True

Assume (m, w) is the exactly such pair satisfy the requirement. (m = men, w = women)

There're two condition in the matching process.

(Let's let men propose)

i) if w hasn't been proposed to any men when m propose her, then (m, w) becomes a pair and never break up.

ii) if w has been proposed to some men when m propose her, then since w prefer m, w will dumps her current partner and accept m, then (w, m) will become a pair.

So in every stable matching S, the pair (m, w) belongs to S.

Ex3. There's not always exist a stable pair of schedules.

Counterexample.

slot \ network	A	B
Slot 1	Show 1	Show 2
Slot 2	Show 3	Show 4

rating

show 1 show 4
show 3 show 2

consider the left schedule.
A wins all time slot
but B can exchange it's schedule
⇓
then B wins slot 2.
But then A can also exchange to win back, So there's no stable pair of schedule.

Exercise 8.

	1	2	3
A	Y	X	Z
B	X	Y	Z
C	X	Y	Z

Men

	1	2	3
X	A	B	C
Y	B	A	C
Z	A	B	C

Women. (true preference list)

↓ lying

	1	2	3
A	Y	X	Z
B	X	Y	Z
C	X	Y	Z

	1	2	3
X	A	C	B
Y	B	A	C
Z	A	B	C

in this way
X paired with A
X get a better ~~pattern~~ partner by lying.

So there's a swith that would improve the partner of a women who switched preference