(3) allocated resources table:

Processes	r_1	r_2	r_3	r_4	r_5
P_1	1	0	2	1	1
P_2	2	0	1	1	0
P_3	1	1	0	1	0
P_4	1	1	1	1	0

Maximum needs table:

Processes	r_1	r_2	r_3	r_4	r_5
P_1	1	1	2	1	3
P_2	2	2	2	1	0
P_3	2	1	3	1	0
P_4	1	1	2	2	1

Maximum remaining resource needs table:

Processes	r_1	r_2	r_3	r_4	r_5
P_1	0	1	0	0	2
P_2	0	2	1	0	0
P_3	1	0	3	0	0
P_4	0	0	1	1	1

$E = [5, 2, 4+x, 5, 2]$

$A = [0, 0, x, 1, 1]$

if x=0: E = [5, 2, 4, 5, 2]
A = [0, 0, 0, 1, 1]

- no processes can be released, which results in a deadlock with all processes.

if x=1: E = [5, 2, 5, 5, 2]
A = [0, 0, 1, 1, 1]

can only release P_4

$A = [1, 1, 1, 1, 0] = [1, 1, 2, 2, 1]$

- no more processes can be released, which results in a deadlock with P_1, P_2, and P_3.

if x=2: E=[5, 2, 6, 5, 2]
A=[0, 0, 2, 1, 1]

Can only release P_4

$A \pm [1, 1, 1, 1, 0] = [1, 1, 3, 2, 1]$

Can only release P_3

$A \pm [1, 1, 0, 1, 0] = [2, 2, 3, 3, 1]$

Can only release P_2

$A \pm [2, 0, 1, 1, 0] = [4, 2, 4, 4, 1]$

No more processes can be released as P_1 requests 3 units of r_5, and there only exists 2 units of r_5.

This is shown below: