Deadlocks: AO2

1) Oefeningen deadlocks: los onderstaande oefeningen op en geef je resultaat door. Werk alles stap per stap uit.

a) Oefening 1

Proces	Tape	Plotter	Scanner	CD
A	4	2	3	2
B	0	1	0	1
C	2	1	2	1
D	1	0	1	0
E	1	1	0	2

Resources assigned

Proces	Tape	Plotter	Scanner	Cd
A	0	1	0	1
B	1	1	1	2
C	2	2	0	2
D	3	1	1	0
E	1	1	1	1

Resources still needed

E= (9698)

Is er een deadlock? Bereken stap per stap de P(resources in gebruik) en A(resources beschikbaar).

E = 9698

P = 8566

A = E - P = 1132

① Proces A, ~~B~~ of ~~E~~ helpen

E = 9698

P = 8566
\+ 0101
8667

A = 1132
\- 0101
1031

② Einde proces A

E = 9698

P = 8667
- 4333
4334

A = 1031
+ 4333
5364

③ B helpen

E = 9698

P = 4334
+ 1112
5446

A = 5364
- 1112
4252

④ Einde B

E = 9698

P = 5446
- 1213
4233

A = 4252
+ 1213
5465

⑤ C helpen

E = 9698

P = 4233
+ 2202
6435

A = 5465
- 2202
3263

⑥ Einde C

E = 9698

P = 6435
- 4323
2112

A = 3263
+ 4323
7586

⑦ D helpen

E = 9698

P = 2112
+ 3110
5222

A = 7586
- 3110
4476

⑧ Einde D

E = 9698

P = 5222
- 4120
1102

A = 4476
+ 4120
8596

⑨ E helpen

E = 9698

P = 1102
+ 1111
2213

A = 8596
- 1111
7485

⑩ Einde E

E = 9698

P = 2213
- 2213
0000

A = 7485
+ 2213
9698

geen deadlock → A=E

safe sequence <A,B,C,D,E>

b) Oefening 2

Proces	Tape	Plotter	Scanner	CD			Proces	Tape	Plotter	Scanner	Cd
A	3	1	1	2			A	0	1	0	1
B	2	1	0	1			B	2	1	1	2
C	1	2	3	2			C	2	2	2	1
D	1	2	0	1			D	2	1	1	3
Resources assigned							Resources still needed				

E= (8869)

Is er een deadlock? Bereken stap per stap de P (resources in gebruik) en A(resources beschikbaar).

E = 8869

P = 7646

A = E - P = 1223

① Proces A helpen

E = 8869

P = 7646
\+ 0101
7747

A = 1223
\- 0101
1122

② Einde proces A

E = 8869

P = 7747
\- 3213
4534

A = 1122
\+ 3213
4335

③ B helpen

E = 8869

P = 4534
\+ 2112
6646

A = 4335
\- 2112
2223

④ Einde B

E = 8869

P = 6646
\- 4213
2433

A = 2223
\+ 4213
6436

⑤ C helpen

E = 8869

P = 2433
\+ 2221
4654

A = 6436
\- 2221
4215

⑥ Einde C

E = 8869

P = 4654
\- 3453
1201

A = 4215
\+ 3453
7668

⑦ D helpen

E	=	8869

P	=	1201
	+	2113
		3314

A	=	7668
	-	2113
		5555

⑧ Einde D

E	=	8869

P	=	3314
	-	3314
		0000

A	=	5555
	+	3314
		8869

geen deadlock → A=E

safe sequence <A,B,C,D>

c) Oefening 3

Kan onderstaande safe uitgevoerd worden (stady state)

Proces	Has	Max
A	2	5
B	6	9
C	4	9
D	3	5
E	1	3

Max resources 19

Max resources = 19

HasTotaal = 16

Free resources = 19 - HasTotaal

Free = 19 - 16 = 3

	HAS	MAX
A	2	5
B	6	9
C	4	9
D	3	5
E	1	3
Free = 3		

	HAS	MAX
A	2	5
B	**9**	9
C	4	9
D	3	5
E	1	3
Free = 0		

	HAS	MAX
A	2	5
B	0	-
C	4	9
D	3	5
E	1	3
Free = 9		

	HAS	MAX
A	**5**	5
B	0	-
C	4	9
D	3	5
E	1	3
Free = 6		

	HAS	MAX
A	0	-
B	0	-
C	4	9
D	3	5
E	1	3
Free = 11		

	HAS	MAX
A	0	-
B	0	-
C	**9**	9
D	3	5
E	1	3
Free = 6		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	3	5
E	1	3
Free = 15		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	**5**	5
E	1	3
Free = 13		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	0	-
E	1	3
Free = 18		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	0	-
E	**3**	3
Free = 16		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	0	-
E	0	-
Free = 19		

Safe !

Safe sequence <B,A,C,D,E>

d) Oefening 4

Kan onderstaande safe uitgevoerd worden (stady state)

Proces	Has	Max
A	1	4
B	5	9
C	1	9
D	2	7
E	3	4
F	1	7

Max resources 15

Max resources = 15

HasTotaal = 13

Free resources = 19 - HasTotaal

Free = 15 - 13= 2

	HAS	MAX
A	1	4
B	5	9
C	1	9
D	2	7
E	3	4
F	1	7
Free = 2		

	HAS	MAX
A	1	4
B	5	9
C	1	9
D	2	7
E	**4**	4
F	1	7
Free = 1		

	HAS	MAX
A	1	4
B	5	9
C	1	9
D	2	7
E	0	-
F	1	7
Free = 5		

	HAS	MAX
A	**4**	4
B	5	9
C	1	9
D	2	7
E	0	-
F	1	7
Free = 2		

	HAS	MAX
A	0	-
B	5	9
C	1	9
D	2	7
E	0	-
F	1	7
Free = 6		

	HAS	MAX
A	0	-
B	**9**	9
C	1	7
D	2	7
E	0	-
F	1	7
Free = 2		

	HAS	MAX
A	0	-
B	0	-
C	1	9
D	2	7
E	0	-
F	1	7
Free = 11		

	HAS	MAX
A	0	-
B	0	-
C	**9**	9
D	2	7
E	0	-
F	1	7
Free = 3		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	2	7
E	0	-
F	1	7
Free = 12		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	7	7
E	0	-
F	1	7
Free = 7		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	0	-
E	0	-
F	1	7
Free = 14		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	0	-
E	0	-
F	**7**	7
Free = 8		

	HAS	MAX
A	0	-
B	0	-
C	0	-
D	0	-
E	0	-
F	0	-
Free = 15		

Safe !

Safe sequence <E,A,B,C,D,F>