79 _____

```
semaphore s1, s2
s1.init(0)
s2.init(0)
process P                process Q
p_1                      q_1
s1.signal()              s1.wait()
p_2                      q_2
s2.wait()                s2.signal()
p_3                      q_3
```

80 _____

```
semaphore s1
s1.init(0)
process P          process Q          process R
p_1                q_1                r_1
s1.signal()        s1.wait()          s1.wait()
                   s1.signal()        s1.signal()
p_2                q_2                r_2
p_3                q_3                r_3
```

81 _____

```
semaphore s1, s2
s1.init(0)
s2.init(0)
process P                process Q
 p_1                      q_1
 s1.signal()              s2.signal()
 s2.wait()                s1.wait()
 p_2                           q_2
```

82 _____

```
semaphore s1, s2
s1.init(0)
s2.init(0)
process P                process Q
                          s1.wait()
 p_1                      q_1
 s1.signal()              s2.signal()
 s2.wait()                s1.wait()
 p_2                           q_2
```

s1.signal() s2.signal()

s2.wait() s1.wait()

p_3 q_3

s1.signal()

83 _____

semaphore s1, s2

s1.init(0)

s2.init(0)

process P	process Q	process R
p_1	q_1	r_1
s1.signal()	s1.wait()	s1.wait()
	s1.signal()	s1.signal()
p_2	q_2	r_2
s2.wait()		s2.signal()
p_3	q_3	r_3

84 _____

semaphore s1, s2. s3

s1.init(0)

s2.init(0)

s3.init(0)

process P	process Q	process R
p_1	q_1	r_1
s1.signal()	s2.signal()	s3.signal()
s3.wait()	s1.wait()	s2.wait()
p_2	q_2	r_2
s1.signal()	s2.signal()	s1.wait()
		s2.wait()
p_3	q_3	r_3

85 _____

```
semaphore s1, s2
s1.init(1)
s2.init(0)
```

process P	process Q	process R
p_1	q_1	r_1
s1.wait()	s1.wait()	s2.wait()
p_2	q_2	r_2
s2.signal()	s2.signal()	s1.signal()
p_3	q_3	r_3

86 _____

semaphore s1, s2

s1.init(0)

s2.init(0)

s3.init(0)

process P	process Q	process R
p_1	q_1	r_1
s1.signal()	s1.wait()	s1.wait()
	s1.signal()	s1.signal()
p_2	q_2	r_2
s2.wait()	s2.signal()	s3.signal()
s3.wait()		
p_3	q_3	r_3

87 _____

semaphore s1, s2, s3

s1.init(0)

s2.init(0)

s3.init(0)

process P	process Q	process R
	s1.wait()	s2.wait()
p_1	q_1	r_1
s1.signal()	s2.signal()	s3.signal()

s3.wait()	s1.wait()	s2.wait()
p_2	q_2	r_2
s1.signal()	s2.signal()	

88 _____

```
semaphore s1, s2
s1.init(0)
s2.init(0)
```

process P	process Q
p_1	q_1
s1.signal()	s2.signal()
s2.wait()	s1.wait()
p_2	q_2
s1.signal()	s2.signal()
s2.wait()	s1.wait()
p_3	q_3

89 _____

```
semaphore s1, s2, s3
s1.init(0)
s2.init(0)
s3.init(0)
```

process P	process Q	process R
p_1	q_1	r_1
s1.signal()	s2.signal()	s3.signal
s2.wait()	s1.wait()	s1.wait()
s2.signal()	s1.signal()	s1.signal()
s3.wait()	s3.wait()	s2.wait()
s3.signal()	s3.signal()	s2.signal()
p_2	q_2	r_2

90 _____

semaphore s1.s2

s1.init(0)

process P	process Q	process R
p_1	q_1	r_1
s1.signal()	s1.wait()	s1.wait()
p_2	q_2	r_2
p_3	q_3	r_3
	s1.signal()	s1.signal()

Processes with many copies

93 _____

```
semaphore s1, s2
s1.init(1)
s2.init(0)
process P                    process Q
s1.wait()                    s2.wait()
p_1                          q_1
p_2                          q_2
s2.signal()                  s1.signal()
```

94 _____

```
semaphore s1, s2, s3
s1.init(1)
s2.init(0)
s3.init(0)
process P                    process Q
s1.wait()
p_1                          q_1
s2.signal()                  s2.wait()
p_2                          q_2
s3.wait()                    s3.signal()
p_3                          q_3
```

s1.signal()

95 _____

semaphore s1.s2

s1.init(1)

s2.init(0)

s3.init(0)

process P process Q process R

s1.wait() s2.wait() s3.wait()

p_1 q_1 r_1

p_2 q_2 r_2

s2.signal() s3.signal() s1.signal()

96 _____

semaphore s1.s2

s1.init(1)

s2.init(0)

process P process Q process R process W

s1.wait() s1.wait()
s2.wait() s2.wait()

p_1 q_1 r_1
w_1

p_2 q_2 r_2
w_2

s2.signal() s2.signal()
s1.signal() s1.signal()

97 _____

semaphore s1, s2

s1.init(0)

s2.init(0)

process P	process Q	process R
		s1.wait()
		s1.signal()
		s2.wait()
		s2.signal()
p_1	q_1	r_1
p_2	q_2	r_2
s1.signal()	s2.signal()	

Use COUNTER

98 _____!!!!! Да се

внимава с бариерата

```
semaphore s1
s1.init(1)
s2.init(0)
int cnt=0
process P
p_1
s1.wait()
cnt=cnt+1
if cnt=3 s2.signal()
s1.signal()
s2.wait()
s2.signal()
p_2
```

99 _____

```
semaphore s1, s2
s1.init(0)
s2.init(0)
process P                    process Q
p_1                            q_1
```

s1.signal()	s2.signal()
s2.wait()	s1.wait()
s2.signal()	s1.signal()
p_2	q_2
p_3	q_3