СЕМАФОРИ

↳ ЕДИНИЧНИ ПРОЦЕСИ

noted СЕМАФОРИ

2016-SE-01

$p_1 < q_2$

$q_2 < p_3$

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

process P
  p1
  s1.signal()
  p2
  s2.wait()
  p3

process Q
  q1
  s1.wait()
  q2
  s2.signal()
  q3
```

2017-SE-01

$p_1 < q_2$ и r_2

```
semaphore s1
s1.init(0)

P
p1
s1.signall()
p2
p3

Q
q1
s1.wait()
s1.signal()
q2
q3

R
r1
s1.wait()
s1.signall()
r2
r3
```

2017-SE-05

$p_1 < q_1 < p_2 < q_2 < p_3 < q_3$

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

P
p1
s1.signall()
s2.wait
p2
s1.signal()
s2.wait()
p3
s1.signall()

Q
s1.wait()
q1
s2.signal()
s1.wait()
q2
s2.signal()
s1.wait()
q3
```

2017-SE-04

$p_1 < q_2$

$q_1 < p_2$

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

```
P
p1
s1.signal()
s2.wait()
p2
p3
```

```
Q
q1
s2.signal()
s1.wait()
q2
q3
```

2018-CS-01

$p_1 < q_2$ u r_2

$r_2 < p_3$

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

```
P
p1
s1.signal()
p2
s2.wait()
p3
```

```
Q
q1
s1.wait()
s1.signal()
q2
q3
```

```
R
r1
s1.wait()
s1.signal()
r2
s2.signal()
r3
```

2018-CS-02

$p_1 < q_2$

$q_1 < r_2$

$r_1 < p_2$

r_3 ~~x~~ p_2 u q_2

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

```
P
p1
s1.signal()
s3.wait()
p2
s1.signal()
p3
```

```
Q
q1
s2.signal()
s1.wait()
q2
s2.signal()
q3
```

```
R
r1
s3.signal()
s2.wait()
r2
s1.wait()
s2.wait()
r3
```

2018-SE-01

p2 unu q2 < r2

if p2 < r2 => q2 > r2

if q2 < r2 => p2 > r2

semaphore s1, s2

s1.init(1)

s2.init(0)

P	Q	R
p1	q1	r1
s1.wait()	s1.wait()	s2.wait()
p2	q2	r2
s2.signal	s2.signal()	s1.signal()
p3	q3	r3

2019-CS-01

p1 < q2 u r2

p3 > q2 u r2

semaphore s1, s2, s3

s1.init(0)

s2.init(0)

s3.init(0)

P	Q	R
p1	q1	r1
s1.signal()	s1.wait()	s1.wait()
p2	s1.signal()	s1.signal()
s2.wait()	q2	r2
s3.wait()	s2.signal()	s3.signal()
p3	q3	r3

2019-CS-02

p1 < q1 < r1 < p2 < q2 < r2

semaphore s1, s2, s3

s1.init(0)

s2.init(0)

s3.init(0)

P	Q	R
p1	s1.wait()	s2.wait()
s1.signal()	q1	r1
s3.wait()	s2.signal()	s3.signal()
p2	s1.wait()	s2.wait()
s1.signal()	q2	r2
	s2.signal()	

2019 - SE - 01

$p_1 < q_2$

$q_2 < p_3$

$q_1 < p_2$

$p_2 < q_3$

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

```
P
p1
s1.signal()
s2.wait()
p2
s1.signal()
s2.wait()
p3
```

```
Q
q1
s2.signal()
s1.wait()
q2
s2.signal()
s1.wait()
q3
```

2020 - CS - 01

$p_1 < q_2$ u r_2

$q_1 < p_2$ u r_2

$r_1 < p_2$ u q_2

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

```
P
p1
s1.signal()
s2.wait()
s3.wait()
p2
```

```
Q
q1
s2.signal()
s1.wait()
s3.wait()
q2
```

```
R
r2
s3.signal()
s1.wait()
s2.wait()
r2
```

2020 - SE - 03

$p_1 < q_2$ u r_2

if $q_2 < r_2 \Rightarrow q_3 < r_2$

if $r_2 < q_2 \Rightarrow r_3 < q_2$

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

```
P
p1
s1.signal()
p2
p3
```

```
Q
q1
s1.wait()
q2
q3
s1.signal()
```

```
R
r1
s1.wait()
r2
r3
s1.signal()
```

Процеси с много копия

2017-SE-08

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

```
P
s1.wait()
p1
p2
s2.signal()
```

```
Q
s2.wait()
q1
q2
s1.signal()
```

2018-SE-03

```
semaphore s1, s2, s3
s1.init(1)
s2.init(0)
s3.init(0)
```

```
P
s1.wait()
p1
s2.signal()
p2
s3.wait()
p3
s1.signal()
```

```
Q
q1
s2.wait()
q2
s3.signal()
q3
```

2020-CS-01

```
semaphore s1,s2
s1.init(1)
s2.init(0)
s3.init(0)
```

```
P
s1.wait()
p1
q1
s2.signal()
```

```
Q
s2.wait()
q1
q2
s3.signal()
```

```
R
s3.wait()
r1
r2
s1.signal()
```

2020-SE-01

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

```
P
s1.wait()
p1
p2
s2.signall()
```

```
Q
s1.wait()
q1
q2
s2.signall()
```

```
R
s2.wait()
r1
r2
s1.signall()
```

```
W
s2.wait()
w1
w2
s1.signall()
```

2021-SE-01

P и Q еднакви
Т → много копия

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

```
P
p1
p2
s1.signall()
```

```
Q
q1
q2
s2.signall()
```

```
R
s1.wait()
s2.wait()
s1.signall()
s2.signall()
r1
r2
```

2023-CS-01

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

```
P
s1.wait()
p1
p2
s1.signall()
s2.signall()
```

```
Q
s1.wait()
s1.signall()
s2.wait()
q1
q2
s2.signall()
```

2023-SE-01

PQPRPQPR...

semaphore s1,s2,s3
s1.init(1)
s2.init(0)
s3.init(0)
cnt=0

```
P
s1.wait()
p1
q1
cnt++
if cnt == 2:
    s3.signall()
    cnt=0
else
    s2.signall()
```

```
Q
s2.wait
q1
q2
s1.signall()
```

```
R
s3.wait()
r1
r2
s1.signall()
```

2023-SE-02

```
semaphore s1
s1.init(1)
int cnt=0
```

```
P
s1.wait()
if cnt != 0:
        s1.signal()

cnt = 1
p1
p2
s1.signal()
```

→ ПОЗВАНЕ НА ФУНКЦИЯ

2019-SE-01

```
semaphore s1
s1.init(1)
s2.init(0)
cnt=0
```

```
P
s1.wait()
  p1
  cnt++
  if cnt >= 3:
        s2.signal()

  s1.signal()
  s2.wait()
  s2.signal()
    p2
```

2020-SE-01

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

```
P
p1
s1.signal()
s2.wait()
s2.signal()
  p2
  p3
```

```
Q
q1
s2.signal()
s1.wait()
s1.signal()
  q2
  q3
```

2020-SE-01

PQQ PQQP...

```
semaphore s1,s2
s1.init(1)
s2.init(0)
int cnt =0
```

```
P
s1.wait()
  P1
  P2
s2.signal()
```

```
Q
s2.wait()
  Q1
  Q2
  cnt++
  if cnt == 2:
      cnt=0
      s1.signal()
  else:
      s2.signal()
```

2022_IN-02

PPQQQPP...

```
semaphore s1,s2
s1.init(1)
s2.init(0)
int cnt=0
```

```
P
s1.wait()
  P1
  P2
  cnt ++
  if cnt ==2:
      cnt=0
      s2.signal()
  else
      s1.signal()
```

```
Q
s2.wait()
  Q1
  Q2
  cnt++
  if cnt == 3:
      cnt=0
      s1.signal()
  else
      s2. signal()
```

2023-IN-01

```
int cnt=0
semaphore s1,s2,s3
s1.init(1)
s2. init(1)
s3. init(0)
```

```
WHILE true
  P1
  s1.wait()
  s1. signal()
  s2.wait()
  cnt++
  if cnt < N:
      s2. signal()
      s3. wait()
      s3. signal()
  else:
      s2. signal()
      s1.wait()
      s3.signal()

P2
s2.wait()
cnt--
if cnt == 0:
      s3.wait()
      s1.signal
s2.signal()
```

2023-SE-01

P и Q едновременно

```
semaphore s1,s2,s3
s1.init(1)
s2.init(0)
s3.wait(1)
```

```
P
s1.wait()
  p1
  p2
s2.signal()
```

```
Q
s1.wait()
  q1
  q2
s2.signal()
```

```
R
s2.wait()
s2.signal()
  r1
  r2
s3.wait()
cnt++
if cnt == 3:
    s1.signal()
s3.signal()
```

2024-IV-01

```
semaphore s1
s1.init(1)
int cnt=0
```

```
P
s1.wait()
if cnt != 0:
    s1.signal()

p1
cnt++
s1.signal()
  p2
  p3
```