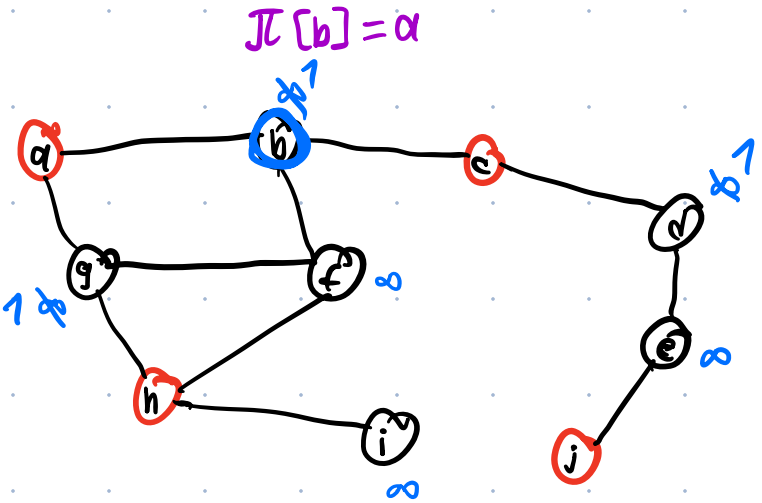
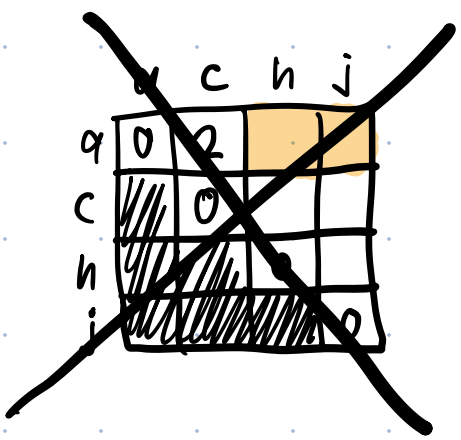
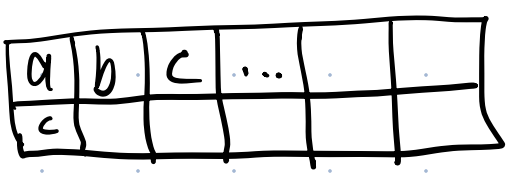
5.

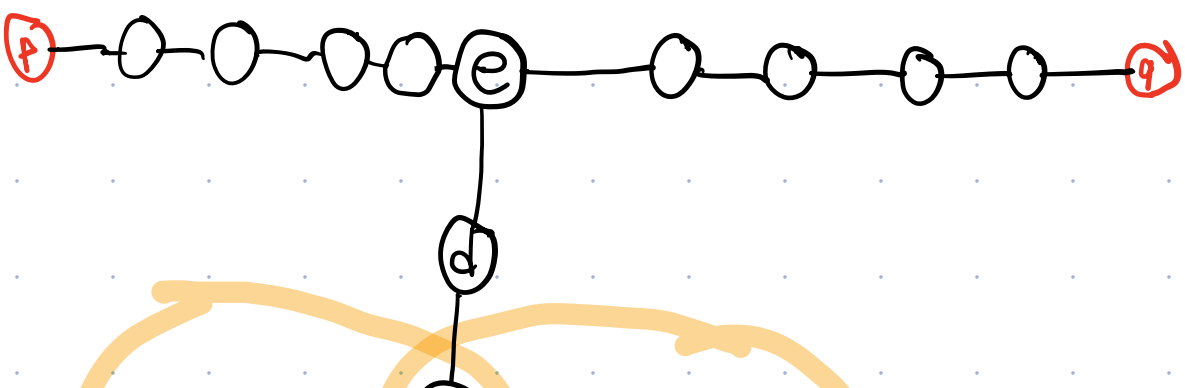
$O(m \cdot (|V|+|E|))$

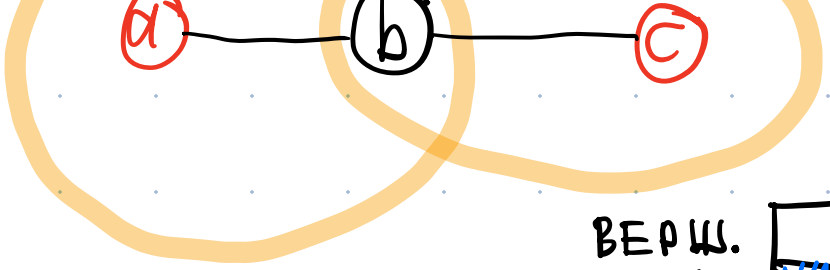



BFS

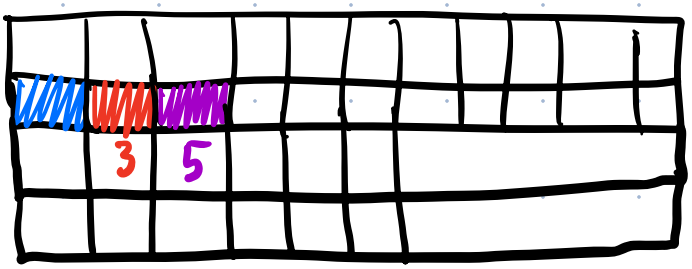



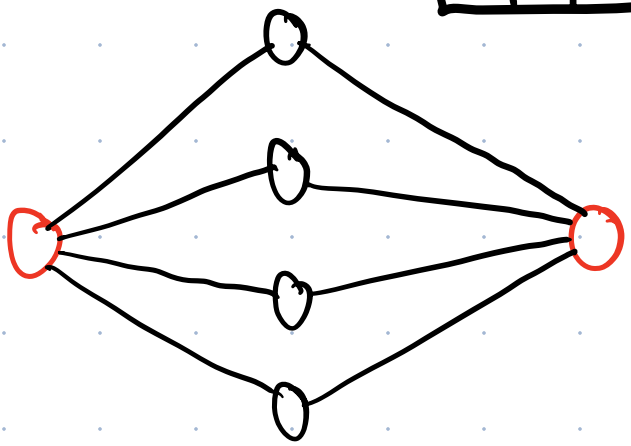



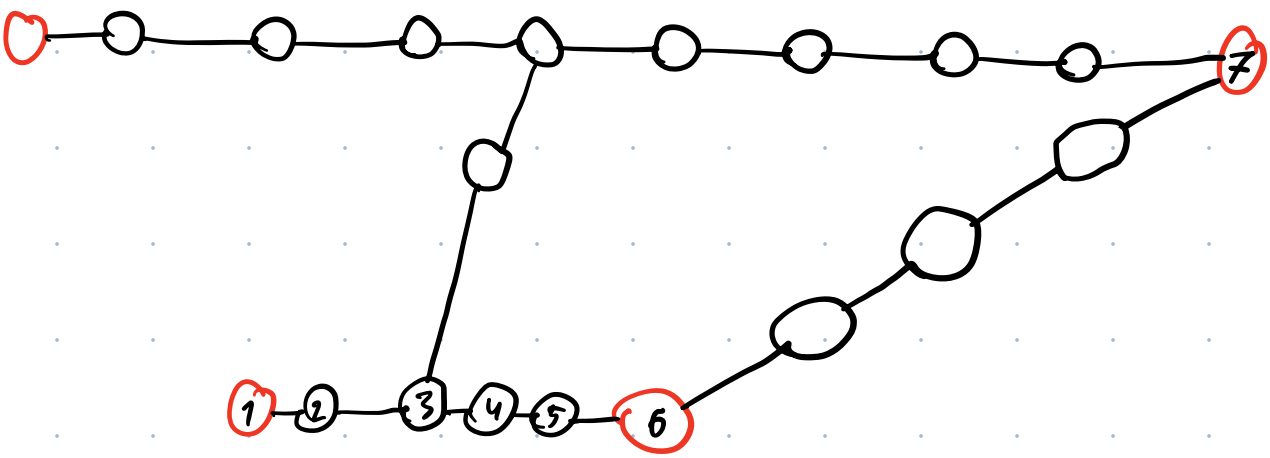


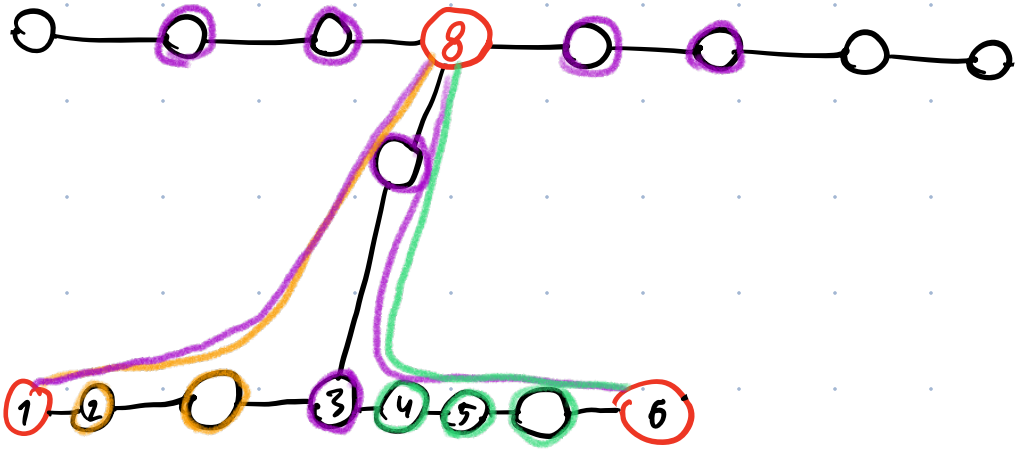

НЕ ТАКСОВОДЫ

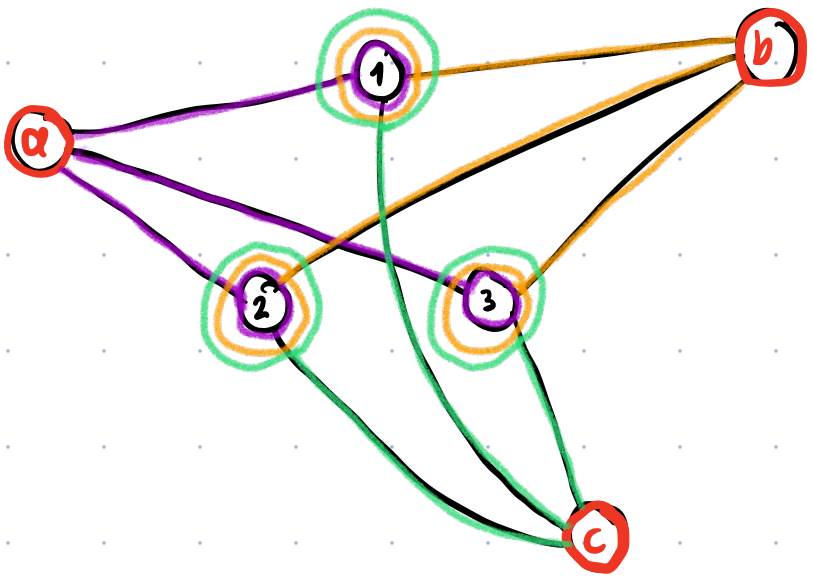



ВЕРШ.
"ЧЬЯ"
РАССТ.
ПРЕДОК

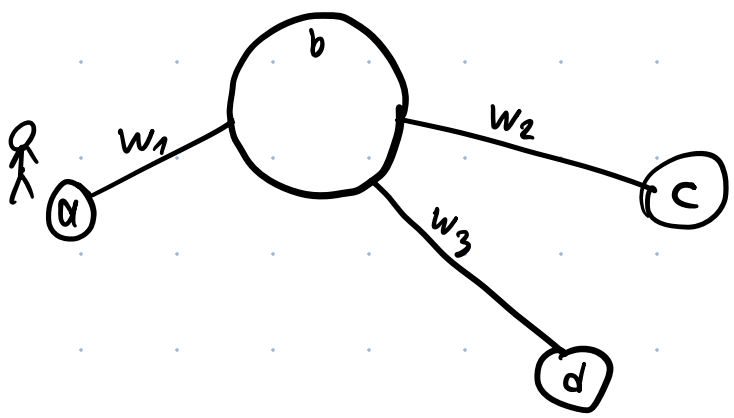


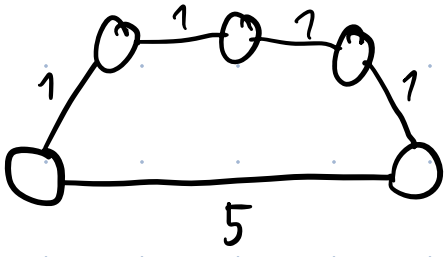


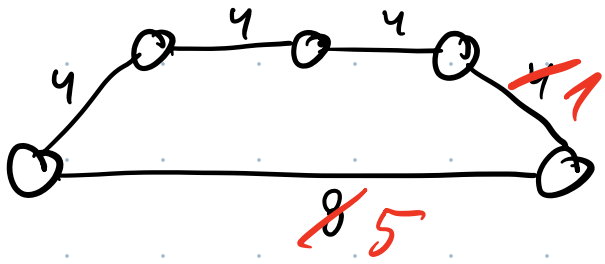


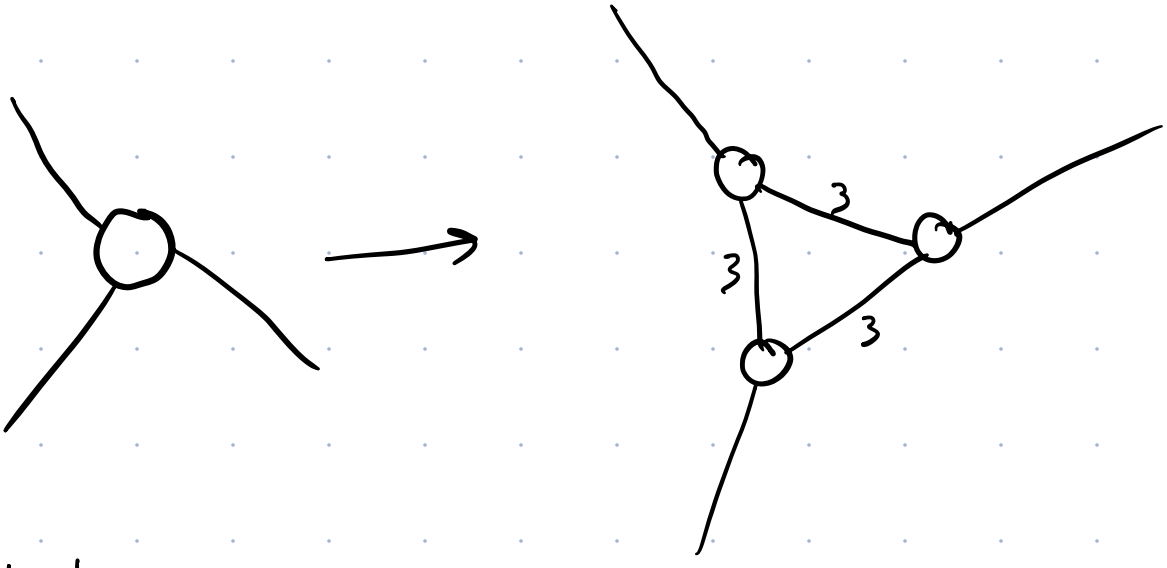




ЗАДАЧА 1.





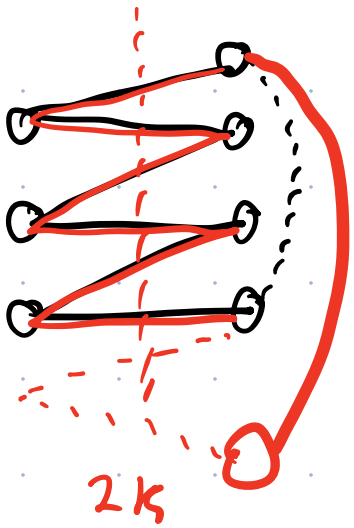




$|V|, |E| \to k|V|, |E| + k|V|$

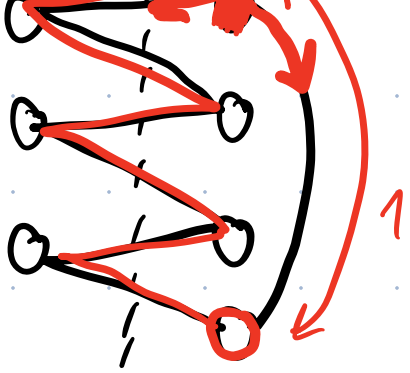
---

ЗАДАЧА 3

1) НЕЧ. ДЛИН. => НЕ ДВУД.




2) НЕ ДВУД. => НЕЧ. ДЛИН.




ДЛЯ G $\nexists$ НЕЧ. ЦИКЛ $\Rightarrow$ ГРАФ G ДВУД.

ПРЕДП., ЧТО G НЕ ДВУД.

1) $\exists$

2) $\nexists$ $\Rightarrow$ ДВУД.

G НЕ ДВУД. $\Rightarrow$ $\exists$ НЕЧ. ЦИКЛ

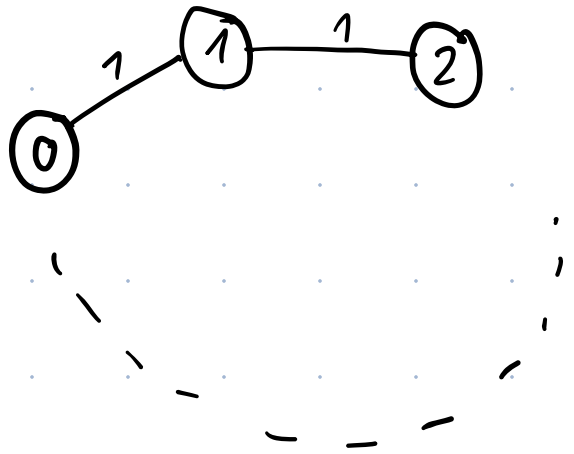
$A \Rightarrow B$

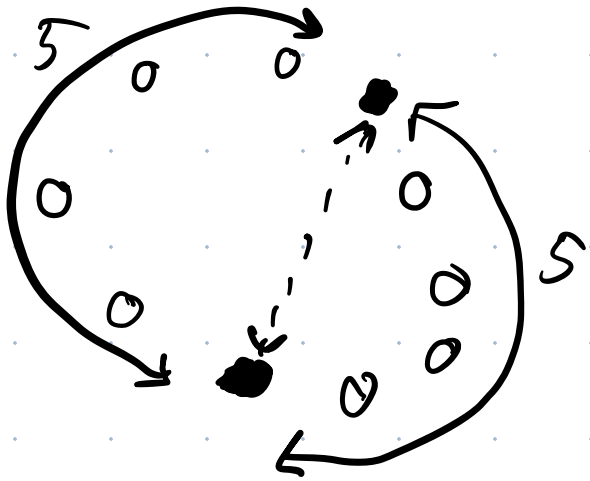
$\neg B \Rightarrow \neg A$

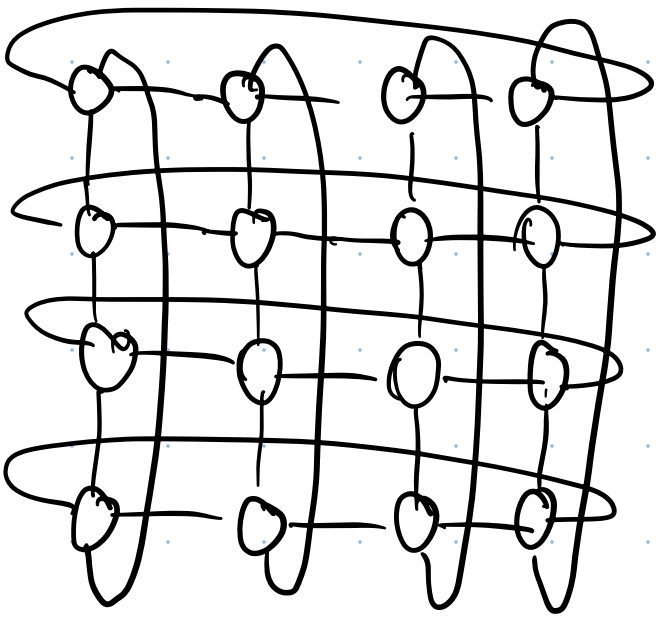
// ЕСЛИ A, ТО B

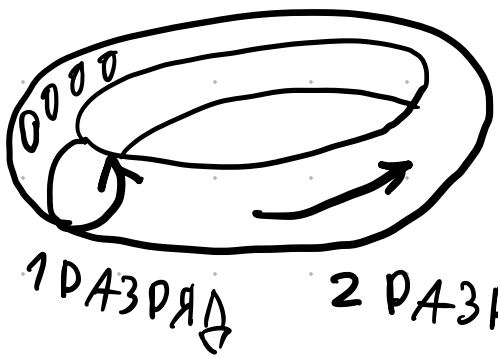
$(A \Rightarrow B) \Rightarrow (\neg B \Rightarrow \neg A)$

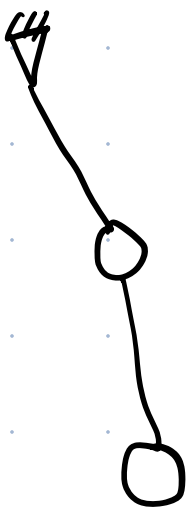
ЗАДАЧА 4 ИЗ ДЗ 10



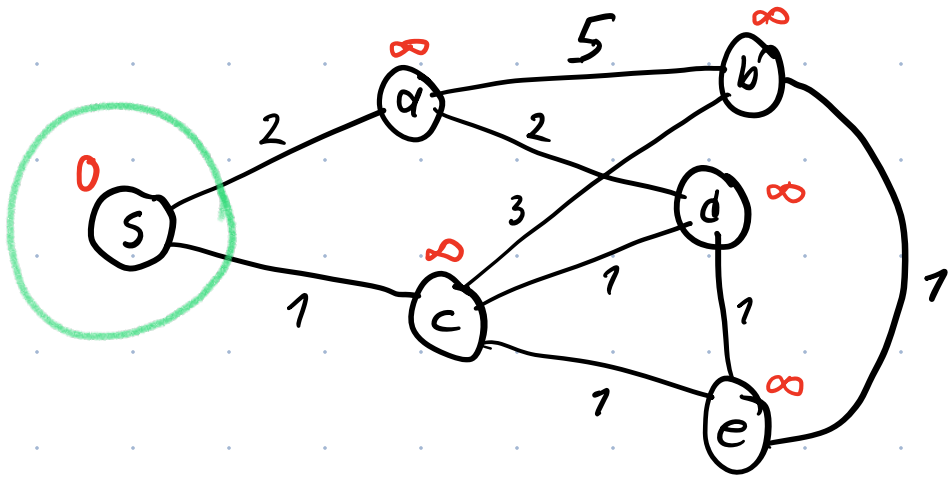


$$\text{ДИАМ.} = \left\lfloor \frac{\text{ОСНОВ. СИС. СЧИСЛ.}}{2} \right\rfloor \cdot \text{ЧИСЛО КОЛЕЦ}$$

$$\left\lfloor \frac{10}{2} \right\rfloor \cdot 4 = 20$$

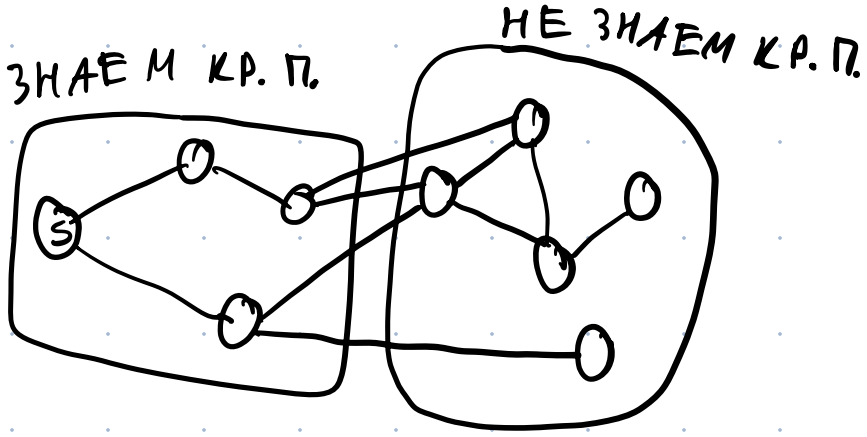
# АЛГОРИТМ ДЕЙКСТРЫ

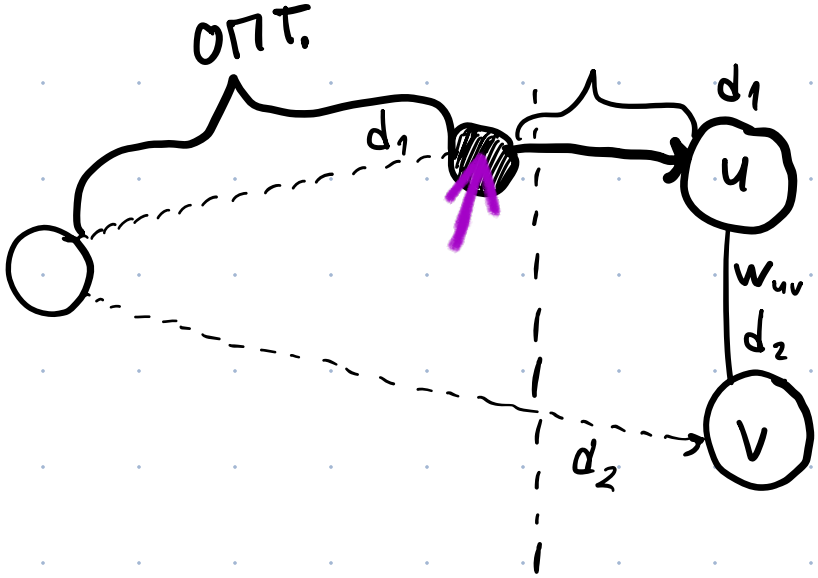



инициализация ($d[v] = \infty$, $d[s] = 0$)

```
for
    u = extr_min(heap)
    for e_uv in E:
        relax(u,v)
```

| s | a | b | c | d | e |
|---|---|---|---|---|---|
| 0 | ∞ | ∞ | ∞ | ∞ | ∞ |




$d_2 > d_1$

1) $d_1 + w_{uv} > d_2$

2) $d_1 + w_{uv} < d_2$

1) $d_1 < d_2$
2) $w_{uv} \geq 0$

$\Rightarrow d_1 < d_2 + w_{uv}$

$$d_u = \min\left(\{v_{\text{непр.}1},\ v_{\text{непр.}2},\ \dots\}\right)$$