Lab9 Questions

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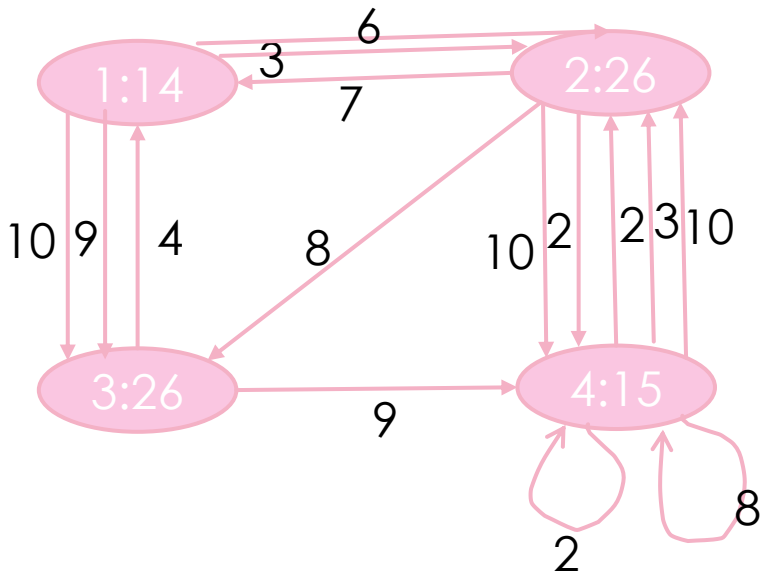
Lab9.A: Voidwalker

- Once there was a voidwalker in the VOID who was eager for power.
- The VOID consists of N spots and M one-way tunnels. The voidwalker can walk through tunnel i by spending w_i energy (a positive w_i means lossing w_i energy, a negative w_i means gaining $|w_i|$ energy, while $w_i = 0$ means no effect).
- The characteristic of energy differs in different spots. In spot i, the voidwalker can compose an energy core using a_i energy or decompose an energy core into a_i energy. The voidwalker can carry at most one energy core with him while walking through a tunnel, since there will be a disaster otherwise.
- The voidwalker begins its journey at spot S with initial power 0. It wonders the maximum energy it can reach with no more than $2K$ operations (an operation is either a compose or a decompose). It is valid for the energy to fall to negative.
- If the voidwalker can gain infinite energy, output **INVINCIBLE**.

Sample 1 Input

4 15 3 1
14 26 26 15
2 1 7
1 2 3
4 2 10
2 4 2
3 1 4
1 3 9
4 2 2
2 3 8
4 4 8
3 4 9
1 3 10
1 2 6
4 4 2
4 2 3
2 4 10



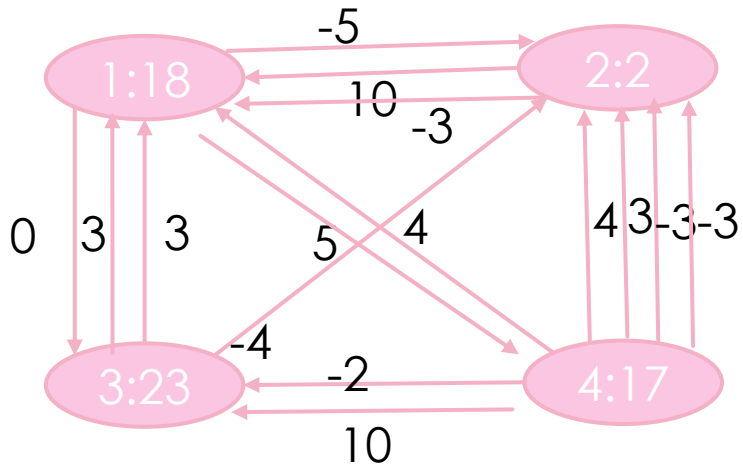
Sample 1 Output

23

start from S=1 initial energy E = 0 Operation cnt = 2*3 = 6
node 1 : compose energy core: E = 0 – 14 ,Operation cnt - 1= 5
node 1→ node 2: E – dis(1,2) = -14 – 3 = -17
node 2: decompose energy core: E + 26 = 9 ,Operation cnt - 1= 4
node 2→ node 4: E - dis(2,4) = 9 – 2 = 7
node 4→ compose energy core: E = E – 15 = -8, Operation cnt - 1= 3
node 4→ node 2: E - dis(4,2) = -8 – 2 = -10
node 2→ decompose energy core: E + 26 =16,Operation cnt - 1= 2
node 2→ node 4: E - dis(2,4) = 16 – 2 = 14
node 4→ compose energy core: E = E – 15 = -1, Operation cnt - 1= 1
node 4→ node 2: E - dis(4,2) = -1 – 2 = -3
node 2→ decompose energy core: E + 26 = **23** ,Operation cnt - 1= 0

Sample 2 Input

4 15 2 1
18 2 23 17
4 1 4
1 4 5
3 1 3
4 3 10
2 1 10
4 2 3
3 2 -4
3 1 3
1 2 -5
1 3 0
4 2 4
4 2 -3
2 1 -3
4 3 -2
4 2 -3



start from S=1 initial energy E = 0
Easy find there is a cycle which total w_i < 0

INVINCIBLE

Lab9.B: Scream Out Loud

- Lida Pu has long suffered from a compulsion to obtain symmetric things, for example, palindrome strings.
- One day, Lida Pu received a secret mail, in which he saw a string template. The template contains lowercase letters, symbol '?' corresponding to an arbitrary letter and symbol '*' corresponding to a zero or more arbitrary letters.
- Please tell Lida Pu the minimum length of the palindrome string which can be obtained from the given template. If he cannot get a palindrome string anyhow, just tell him to face the reality.
- Note that in Lida Pu's mind, an empty string is also a palindrome string.

symbol '?' corresponding to an arbitrary letter

symbol '*' corresponding to a zero or more arbitrary letters

Sample 1 Input

***ac?ba**