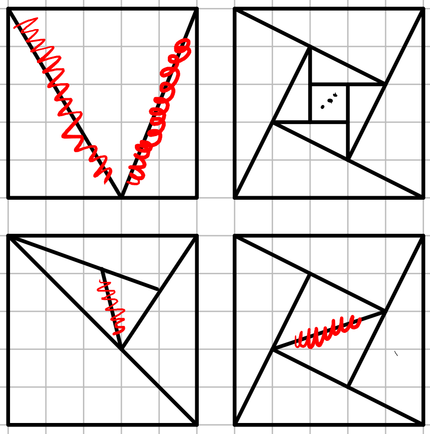
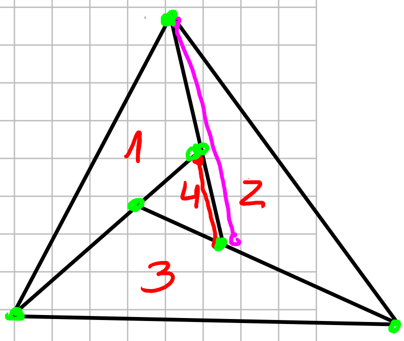
P1

RASCUNHO

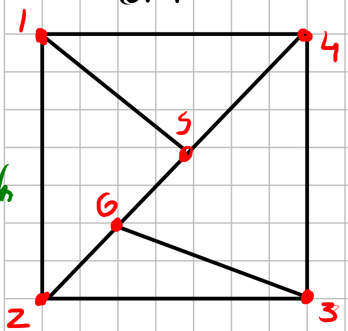


com infinitos dá!



• CONTAR ...O QUE?

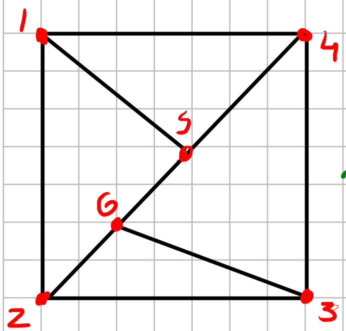
Desenho



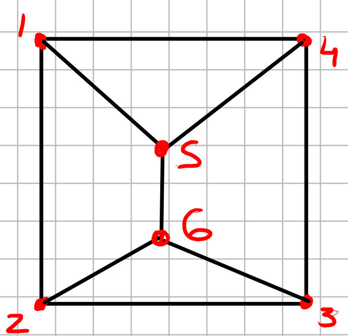
Suponha que uma configuração funciona. Seja T o número de triângulos. Seja V o número de vértices. Seja A o número de arestas. O que são arestas?

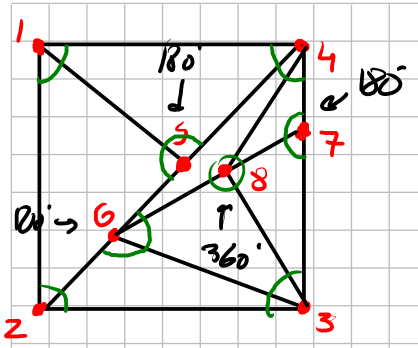
ARESTAS = {14, 12, 34, 32, 26, 65, 54, 15, 36}

G_1



$\rightsquigarrow$ $\boxed{V+(T+1)-A=2}$





CONTAR O QUE?

$V;\ T \quad (A?)$

$$180^\circ \cdot T = \sum \text{ÂNGULOS} = \overset{1}{90^\circ} + \overset{2}{90^\circ} + \overset{3}{90^\circ} + \overset{4}{90^\circ}$$

$$= \underset{5}{180^\circ} + \underset{6}{180^\circ} + \underset{7}{180^\circ} + \underset{8}{360^\circ}$$

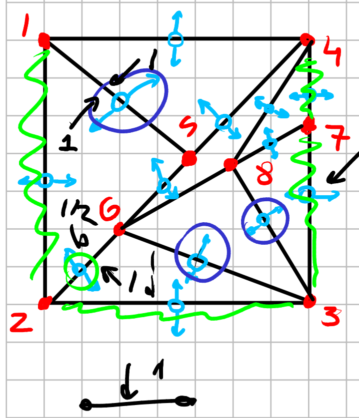
$$\le 4 \cdot 90^\circ + (V-4)\,360^\circ$$

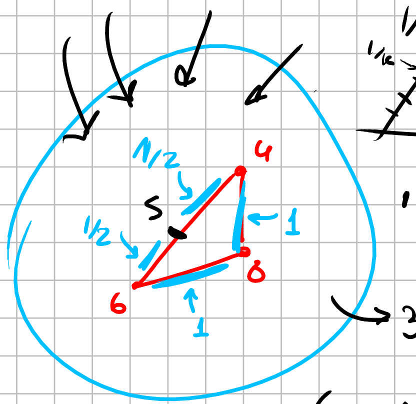
$$\ge 4 \cdot 90^\circ + (V-4)\,180^\circ$$

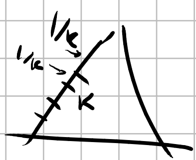
$\boxed{V+(T+1)-A=2}$

$\underline{V+T-1=A}$

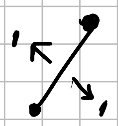
$$\left.\begin{aligned} 180^\circ\ T &\le (V-3)\,360^\circ \\ 180^\circ\ T &\ge (V-2)\cdot 180^\circ \end{aligned}\right\} \Rightarrow \begin{aligned} T &\le 2V-6 \\ T &\ge V-2 \end{aligned}$$







$\frac{3}{2} A \ge \# = 3T$



$\le \frac{3}{2}$

$(A-4)\cdot\frac{3}{2} + 4\cdot 1 \ge 3T$

$\frac{3}{2} A \ge 3T + 2$

$$f(T,A) = \begin{cases} 1/K \\ 0, \text{ se } A \notin T. \end{cases}$$

$$\sum_{T,A} f(T,A) = \sum_A \underbrace{\boxed{\sum_T f(T,A)}}_{\le 3/2} \le \sum_A \frac{3}{2} \le \frac{3}{2} A$$

$$\| $$

$$\sum_T \underbrace{\boxed{\sum_A f(T,A)}}_{3}$$

$$\| $$

$$3T$$

$3T \le \frac{3}{2} A$

$2T \le A$

$V+T-1 = A$

$T \ge V-2$

$A \ge 2T + 4/3$

$\cancel{V} + \cancel{2T} + \cancel{A} - 1 \ge \cancel{V} + \cancel{A} - \cancel{2T} - 2/3$ FALSO

- Olhar como grafo: $V + T - A = 1$

⇝ • Colocar peso em (A,T): $A \geq 2T + 4/3$

- Contar Σ ângulos : $T \geq V - 2$

P2

Lema: $F(\bar{x}) = x_n$, para algum n, com $\bar{x}$ fixo.

$$F((F(\bar{x}), F(\bar{x}), \dots)) = F(\bar{x})$$

$F(\bar{x}) = k$

$F(k, k, \dots) = k$

Logo, $\bar{x}$ e $(F(\bar{x}), F(\bar{x}), \dots)$ não são c.d.

Logo $x_n = F(\bar{x})$, para algum n.

$\rightarrow F((1,2,3,4,\dots)) =: n \quad \rightsquigarrow \quad F(\bar{x}) = x_n$

Queremos mostrar que $F(\bar{x}) = x_n$, $\forall \bar{x} \in \mathbb{N}^{\mathbb{N}}$

Suponha que $n = 1$.

$F((1,2,3,4,\dots)) = 1$

$F((2,1,1,1,1,1,\dots)) = 2 \quad \Rightarrow \quad F(k,1,1,1) = k$

$\Downarrow$

$F((1,2,2,2,2,\dots)) = 1 \quad F(j, k, k, \dots) = j, \forall j, k$

$F(x_i, k, k, k, k \dots) = x_i$

$\rightarrow F(k, \overbrace{x_2, x_3, \dots}^{\text{sem } k}) = k$

$n =$ Fixo

$(x_1, x_2, \dots)$

$\downarrow$

x_n

$F(1,2,3,\dots) = n$

$F(\bar{x}) = x_n$

$F(k, x_3, \overset{\text{sem } k}{k, x_4, \dots, k}) = k$

$\rightarrow F(x_3, k, x_3 + k, k, k, \underset{k+x_3}{\dots}) = x_i$

$\rightsquigarrow F(k, x_2, k, k) = k$

$F(x_i, k, k + x_i,) = x_i$