

# Recuperación parcial 1

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## 1 Pregunta 1

1. Conjunto de nodos:  $\{1, 2, 3, 4, 5, 6, 7\}$

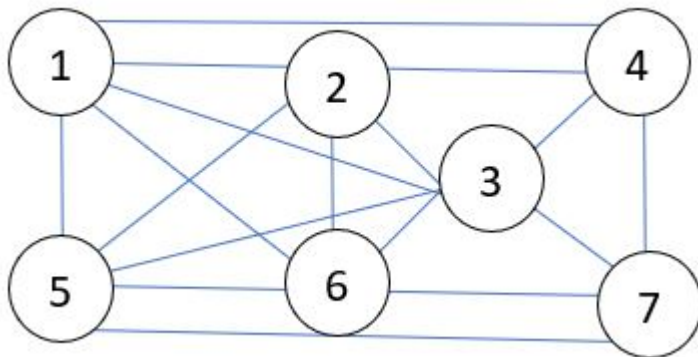
2. Conjunto de vértices:

$\{ \langle 1, 2 \rangle, \langle 1, 3 \rangle, \langle 1, 4 \rangle, \langle 1, 5 \rangle \}$

$\{ \langle 1, 6 \rangle, \langle 4, 2 \rangle, \langle 5, 2 \rangle, \langle 5, 3 \rangle \}$

$\{ \langle 5, 6 \rangle, \langle 5, 7 \rangle, \langle 6, 2 \rangle, \langle 6, 3 \rangle \}$

$\{ \langle 7, 6 \rangle, \langle 7, 4 \rangle, \langle 7, 3 \rangle, \langle 4, 3 \rangle \}$



## 2 Pregunta 2

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Caso base  $n=1$

$$1 = 1(1+1)/2$$

$$1 = 2/2$$

$$1 = 1$$

Caso inductivo  $n = n+1$

$$(1 + 2 + 3 \dots n) + (n + 1) = \frac{(n + 1)(n + 1) + 1}{2} \quad (1)$$

$$= \frac{(n + 1)(n + 1) + 1}{2} \quad (2)$$

$$= \frac{(n+1)(n+2)}{2} \quad (3)$$

$$n = \frac{(n+1)(n+1)+1}{2} \quad (4)$$

### 3 Pregunta 3

$$\sum(n) = 1 + 2 + 3 + 4 + \dots + n$$

$$\sum(n) = 1 + 2 + 3 + 4 + \dots + n = \begin{cases} 0 & \text{si } n = 0 \\ 1 & \text{si } n = 1 \\ \frac{n(n+1)}{2} & \text{si } n = s(i) \end{cases}$$

### 4 Pregunta 4

Demostrar por medio de inducción la comutatividad de la suma de numeros naturales unarios:  $a \oplus b = b \oplus a$

Caso base  $a=0$

$$0 \oplus b = b \oplus 0$$

$$\underline{b = b}$$

$$(a \oplus b = b \text{ si } a = 0)$$

Caso inductivo  $a = s(i)$

$$s(i) \oplus b = b \oplus s(i)$$

$$\underline{s(i \oplus b) = s(i \oplus b)}$$

### 5 Pregunta 5

Demostrar utilizando inducción que  $((n \oplus n) \geq n) = s(0)$ .

Caso base  $n=0$

$$(0 + 0) \geq 0 = (s(0))$$

Caso inductivo  $n = s(i)$

$$s(i) \oplus s(i) \geq s(i)$$

$$s(s(i)) \geq s(i)$$

$$s(s(i) \oplus s(i)) \geq 0$$

$$s(i) \geq 0$$

$$\underline{s(i) \geq 0 = s(0)}$$