



Final

1r. Cognom

2n. Cognom

Nom

DNI

Especialitat: Ingenieria Informàtica

Curs: 1r

Grup:

Assignatura: Matemàtiques Discretes (MATD)

Data: 7, 6, 2021

~~1/0~~ ~~0~~ ~~0~~ ~~2~~ ~~1~~ ~~0~~ ~~5~~ ~~0~~ ~~3~~ ~~1~~ ~~0~~ ~~6~~ ~~0~~ ~~0~~ ~~4~~ ~~1~~
0 0 2 1 0 5 0 3 1 0 6 0 0 4 1
0 8

Prob. 1

$$n \cdot 8 = 2 \cdot 25 \rightarrow n = 6$$

Justificació no correcta!



0/1

Prob. 2

A: a) 3 b) 3 c) 5 d) 3 e) 3 f) 5

g) 3 h) 3 i) 3 j) 5 k) 3 l) 3

m) 3 n) 3 o) 3 p) 3

13 · 3 5 · 3

Justificació no correcta!

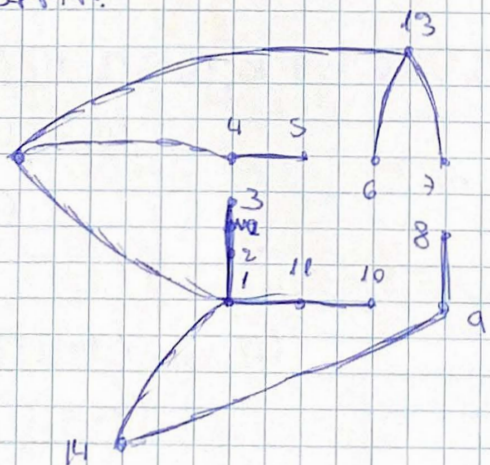
0/1

$$\sum \deg(x_i) + \deg(y_i) = 2 \cdot m \rightarrow 13 \cdot 3 + 5 \cdot 3 = 2 \cdot m$$

$$39 + 15 = 54 = 2 \cdot m \rightarrow m = 27$$

F es bipartit.

Prob. 3



1/1

Prob. 3

$$\begin{aligned}
 & \{1\} \mid \{1\} \mid \emptyset \mid 2 \\
 & \{1,2\} \mid \{1,2\} \mid \{(1,2)\} \mid 11 \\
 & \{1,2,11\} \mid \{1,2,11\} \mid \{(1,2)(1,11)\} \mid 14 \\
 & \{1,2,11,14\} \mid \{1,2,11,14\} \mid \{(1,2)(1,11)(1,14)\} \mid 12 \\
 & \{1,2,11,12,14\} \mid \{1,2,11,12,14\} \mid \{(1,2)(1,11)(1,14)(1,12)\} \mid 3 \\
 & \{2,11,12,14,3\} \mid \{1,2,3,11,12,14\} \mid \{(1,2)(2,3)(1,10)(1,12)(1,14)\} \mid 4 \\
 & \{11,12,14\} \mid \{1,2,3,4,11,12,14\} \mid \{(1,2)(2,3)(1,10)(1,12)(1,14)(12,4)\} \mid 3 \\
 & \{11,12,13,14\} \mid \{1,2,3,4,11,12,13,14\} \mid \{(1,2)(2,3)(1,11)(1,12)(1,14)(12,4)(12,13)\} \mid 10 \\
 & \{10,11,13,14\} \mid \{1,2,3,4,10,11,12,13,14\} \mid \{(1,2)(2,3)(1,11)(1,12)(1,14)(11,10) \\
 & \quad (12,4)(12,13)\} \mid 9 \\
 & \{13,14\} \mid \{1,2,3,4,9,10,11,12,13,14\} \mid \{(1,2)(2,3)(1,11)(1,12)(1,14)(11,10) \\
 & \quad (12,4)(12,13)(14,9)\} \mid 5 \\
 & \{9,4,5,13\} \mid \{1,2,3,4,5,9,10,11,12,13,14\} \mid \{(1,2)(2,3)(1,10)(1,12)(1,14)(11,10) \\
 & \quad (12,4)(12,13)(14,9)(4,5)\} \mid 6 \\
 & \{9,5,13\} \mid \{1,2,3,4,5,6,9,10,11,12,13,14\} \mid \{(1,2)(2,3)(1,11)(1,12)(1,14)(11,10) \\
 & \quad (12,4)(12,13)(14,9)(4,5)(13,6)\} \mid 7 \\
 & \{9,9,13\} \mid \{1,2,3,4,5,6,7,9,10,11,12,13,14\} \mid \{(1,2)(2,3)(1,10)(1,12)(1,14) \\
 & \quad (11,10)(12,4)(12,13)(14,9)(4,5)(13,6) \\
 & \quad (13,7)\} \mid 8 \\
 & \{2\} \mid \{1,2,3,4,5,6,7,8,9,10,11,12,13,14\} \mid \{(1,2)(2,3)(4,5)(9,8)(1,10)(1,12) \\
 & \quad (11,10)(1,14)(12,4)(12,13)(13,6)(13,7) \\
 & \quad (14,9)\} \mid \setminus
 \end{aligned}$$



1r. Cognom

ROCA

2n. Cognom

SALVANS

Nom

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Especialitat: Ingenieria Informàtica

Curs: 1r

Grup:

Assignatura: (MAD)

Data: 7, 6, 2021

Falta en
general
la justificación

0,5/1

$$m = \text{long. max cadena}$$

Por la propiedad que tienen los grafos completos.

Prob. 4

Cad. tenc. = circuit (no rep. aristes)

$$\begin{matrix} K_3 & K_3 & K_7 & K_9 \\ \downarrow & \downarrow & \downarrow & \\ 3 & 10 & & \end{matrix}$$

$$\sum \deg(x_i) = 2 \cdot m \rightarrow n \cdot (n-1) = 2 \cdot m$$

$$\sum n \cdot (n-1) = 2 \cdot m = 3 \cdot 2 = 2 \cdot m \rightarrow m = 3$$

$$n=9 \rightarrow 9 \cdot 8 = 2 \cdot m$$

$$m = 36$$

$$n=5 \rightarrow 5 \cdot 4 = 2 \cdot m \rightarrow m = \frac{20}{2} = 10$$

$$n=7 \rightarrow 7 \cdot 6 = 2 \cdot m \rightarrow m = 21$$

$$n=9 \rightarrow$$

Prob. 5

$$P \cdot 1 = p$$

$$q > 1 \rightarrow \text{para que } \rightarrow q \geq 1 = q - 1$$

$$\sum_{i=1}^{p+q} \deg(x_i) = 2 \cdot m \rightarrow p + q = 2 \cdot m$$

$$\sum_{i=1}^{p+q} \deg(x_i) = p + 2 \cdot (q-1) \quad m = (q-1)$$

Prob. 6

$$8 \text{ assignatures} = n$$

$$\binom{8}{5} = \frac{8!}{(8-5)! \cdot 5!} = \frac{8!}{3! \cdot 5!} = 56$$

$$5 \text{ grup} = m$$

$$2 \text{ p. amb } 5 = 5$$

1/1

Com volem que al menys hi hagi dues persones que tinguin les mateixes assignatures, i hi ha 56 comb. amb combinacions, només necessitem a una persona més

$$56 + 1 = 57 = \text{nombre mínim per a que hi hagi 2 iguals.}$$

Prob. 7

$$B = 2$$

$$A = 3$$

$$2 = 2$$

$$5 = 3$$

Permutació amb rep. limitada $= \frac{(m_1 + m_2 + m_3 + \dots + m_n)!}{m_1! m_2! m_3! \dots m_n!}$

$$\frac{(2 + 3 + 2 + 3)!}{2! 3! 2! 3!} = \frac{10!}{2! 3! 2! 3!} = 25.200$$

~~$\frac{10!}{2! 3! 2! 3!} = \frac{10!}{8! 2!} = \frac{10 \cdot 9 \cdot 8!}{2 \cdot 8!} = \frac{10 \cdot 9}{2} = 45$~~

~~$25.200 \cdot 45 = 1.134.000$~~

0'6/1

Permutació de (10, 2) $\frac{n!}{(n-m)!} = \frac{10!}{8!} = 10 \cdot 9 = 90$

$25.200 \cdot 90 = 2.268.000$

Prob. 8

Mal

$$\sum_{k=0}^{24} \binom{25}{k} 2^{k+1} = 2^1 \cdot 2^2 \cdot 2^3 \dots 2^{25}$$

$$1,2997 \cdot 10^{24}$$

~~$\sum_{k=0}^{24} \binom{25}{k} = 2^{25} = 33.554.432$~~

0/1



1r. Cognom

DOCA

2n. Cognom

SALVANS

Nom

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Especialitat: Ingenieria Informàtica

Curs: 1^{er} Grup:

Assignatura: MATD

Data: 7 / 6 / 2021

Prob. 9

$$a_0 = 1$$

~~$$a_1 = 3$$~~

~~a_0~~

Mal!

$$a_n = -2a_{n-1} + 3a_{n-2} + 2^n, \quad n \geq 2$$

$$a_2 = -2 \cdot 3 + 3 \cdot 1 + 2^2 = 4$$

$$a_3 = -2 \cdot 4 + 3 \cdot 3 + 2^3 = 15$$

$$a_4 = -2 \cdot 15 + 3 \cdot 4 + 2^4 = -11$$

$$a_5 = -2 \cdot (-11) + 3 \cdot 15 + 2^5 = 99$$

$$a_6 = -2 \cdot 99 + 3 \cdot (-11) + 2^6 = -167$$

OK/2

Prob. 10

$$a_{-1} = 0$$

$$a_3 = 3$$

$$a_0 = 1$$

$$a_1 = 1$$

$$a_2 = 2$$

$$a_4 \rightarrow 1, 1, 1, 1 / 2, 2 / 1, 1 / 1, 2, 1 / 1, 1, 2 / 5$$

$$a_5 \rightarrow 1, 1, 1, 1, 1 / 2, 2, 1 / 2, 1, 2 / 1, 2, 2 / 1, 1, 1, 2 / 1, 1, 2, 1 / 1, 2, 1, 1 / 2, 1, 1, 1 / 8$$

$$a_6 \rightarrow 1, 1, 1, 1, 1, 1 / 2, 2, 2 / 2, 2, 1, 1 / 2, 1, 2, 1 / 1, 2, 2, 1 / 1, 2, 1, 2 / 1, 1, 2, 2 / 1, 1, 2, 2 / 13$$

~~$$1, 1, 1, 1, 2 / 1, 1, 1, 2, 1 / 1, 1, 2, 1, 1 / 1, 2, 1, 1, 1 / 2, 1, 1, 1$$~~

$$2, 1, 1, 2 / 13$$

$$a_n = a_{n-1} + a_{n-2}, \quad \forall n \geq 3$$

OK/1

Faltan las wnd iniciales!

Prob. 4

$$|k_3 \cup k_5 \cup k_7 \cup k_9| = |k_3| + |k_5| + |k_7| + |k_9|$$

$$- |k_3 \cap k_5| - |k_3 \cap k_7| - |k_5 \cap k_9|$$

$$- |k_7 \cap k_9| - |k_3 \cap k_9| - |k_5 \cap k_7|$$

$$+ |k_3 \cap k_5 \cap k_7| + |k_5 \cap k_7 \cap k_9| +$$

$$|k_3 \cap k_9 \cap k_7| + |k_9 \cap k_3 \cap k_5| +$$

$$|k_7 \cap k_9 \cap k_3 \cap k_5|$$

$$33 + 20 + 14 + 11$$

$$- 6 - 4 - 2,5 - 1,5 - 3 - 2$$

$$+ 0 + 0 + 0 + 0 + 0 = 59$$