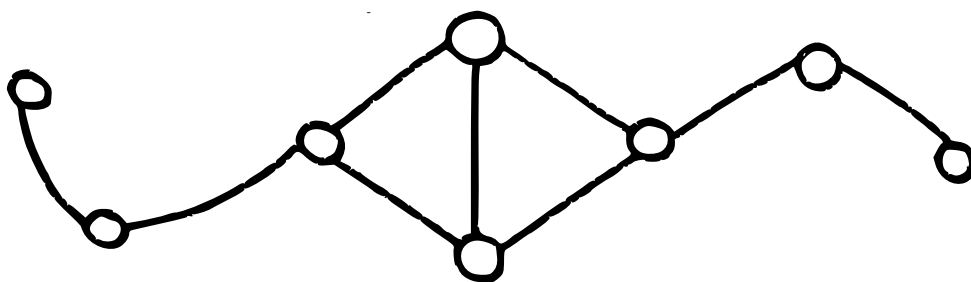


TEORIJA

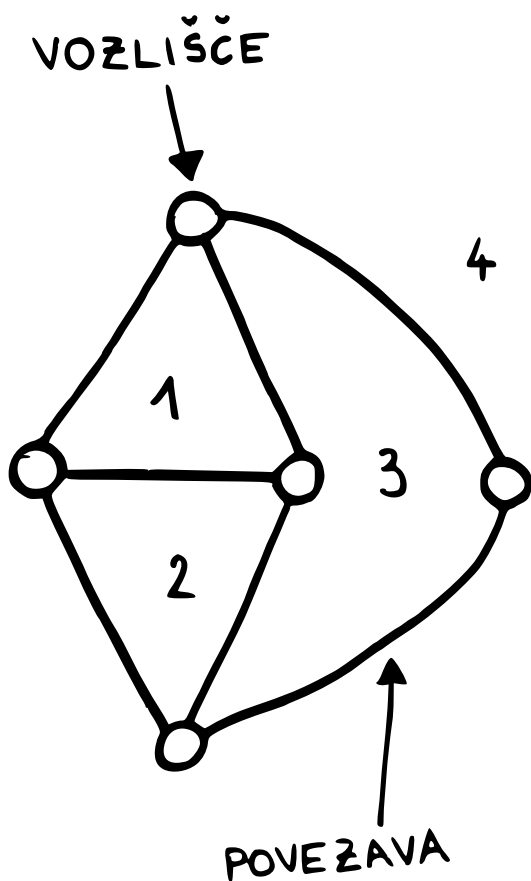
GRAFOV



ZA

OTROKE!

GRAF JE MNOŽICA  
VOZLIŠČ, POVEZANIH  
S POVEZAVAMI.



TA GRAF IMA  
5 VOZLIŠČ  
7 POVEZAV  
RAVNINO PA  
RAZDELI NA  
4 DELE

S ŠTEVILKAMI OD 1 DO 4  
SO OZNAČENI DELI

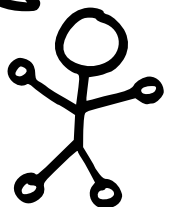
MATEMATIK LEONARD  
EULER JE OPAZIL  
NEKAJ ZANIMIVEGA,  
KO JE IZRAČUNAL:

$$\left( \begin{array}{c} \text{ŠTEVILO} \\ \text{VOZLIŠČ} \end{array} \right) - \left( \begin{array}{c} \text{ŠTEVILO} \\ \text{POVEZAV} \end{array} \right) + \left( \begin{array}{c} \text{ŠTEVILO} \\ \text{DELOV} \end{array} \right)$$

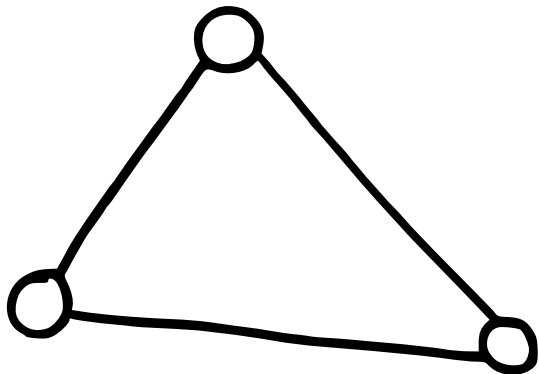
$$V - P + D$$

EULERJEVA KARAKTERISTIKA  
JE, DA JE REZULTAT TE  
ENAČBE VEDNO ENAK 2.

IZGOVORI SE „EULER“



# IZRAČUNAJ JO!

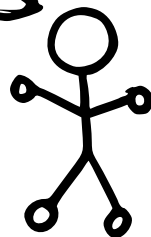


VOZLIŠČA \_\_\_\_\_

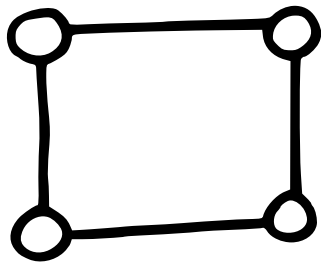
POVEZAVE \_\_\_\_\_

DELI \_\_\_\_\_

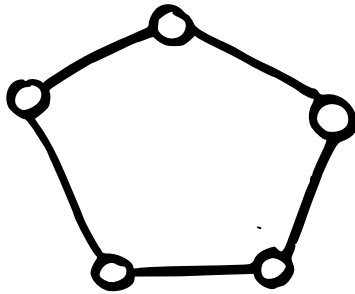
NE POZABI  
ŠTETI TUDI  
ZUNANJEGA  
DELA!



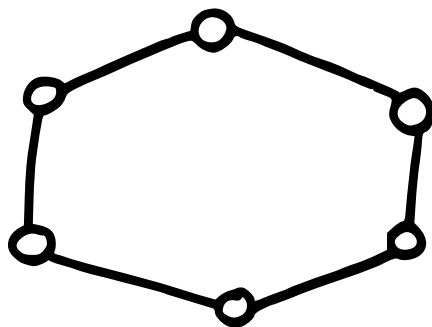
$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



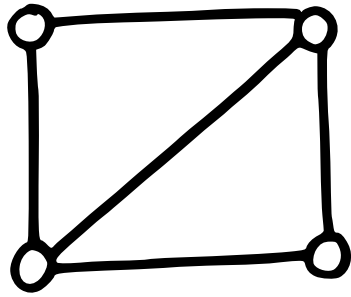
$$V - P + D = \underline{\quad}$$



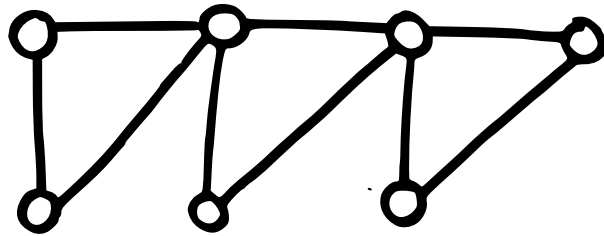
$$V - P + D = \underline{\quad}$$



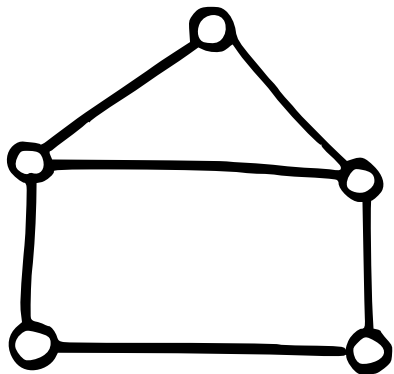
$$V - P + D = \underline{\quad}$$



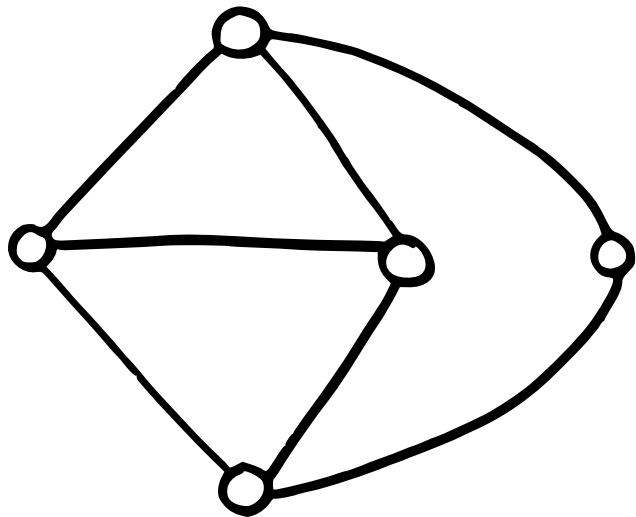
$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



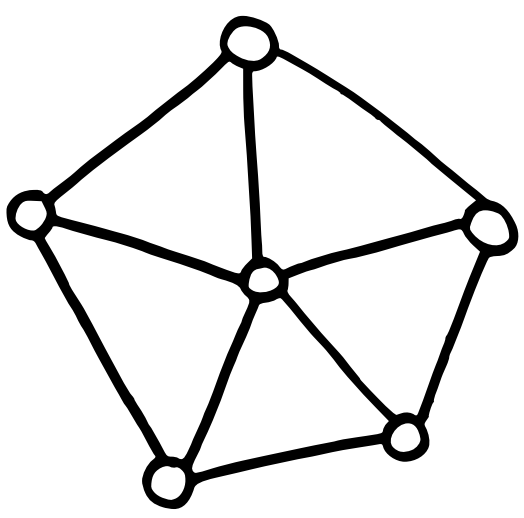
$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



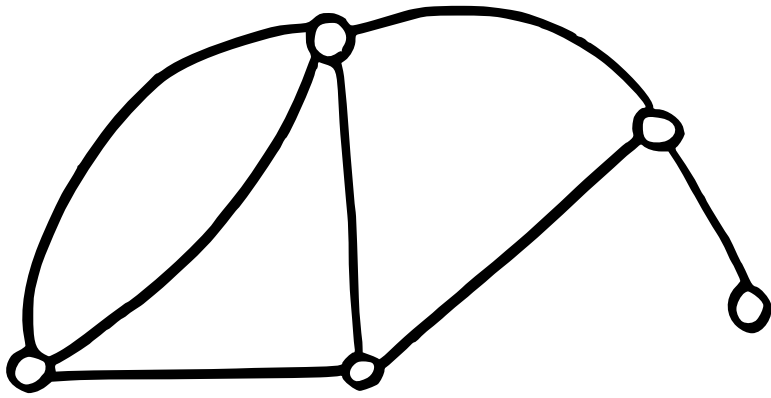
$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



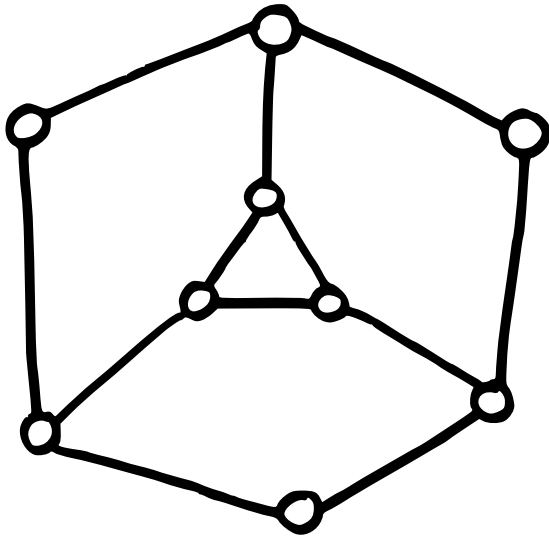
$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



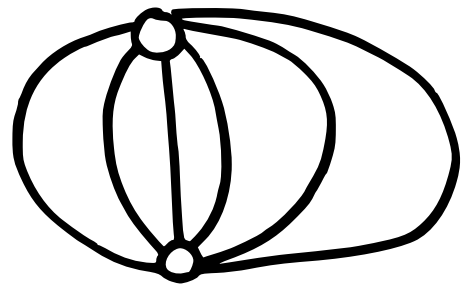
$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



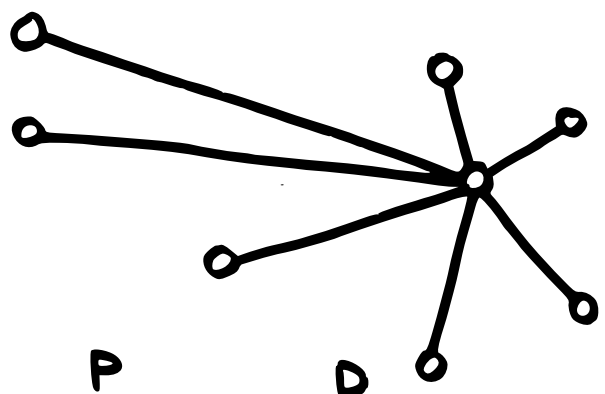
$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



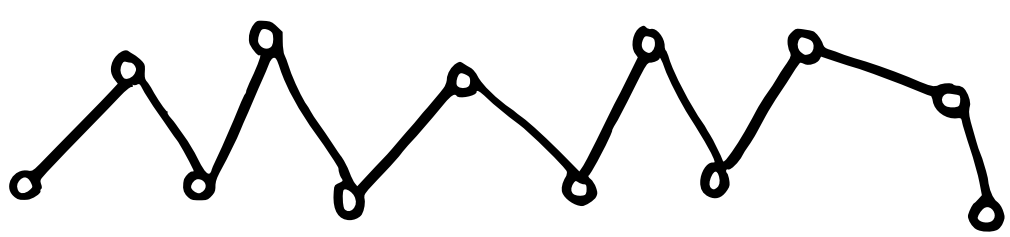
SI VEDNO DOBIL/A 2?  
 POSKUSI ŠE NEKAJ  
 EKSTREMNIH PRIMEROV:



$$V - P + D = \underline{\hspace{2cm}}$$

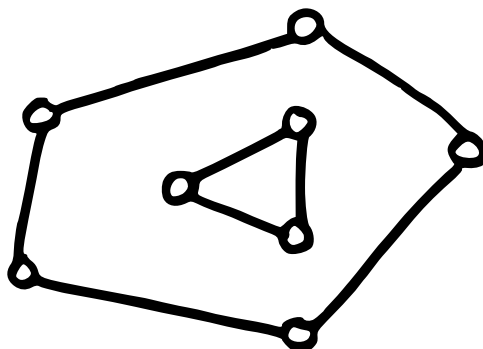


$$V - P + D = \underline{\hspace{2cm}}$$

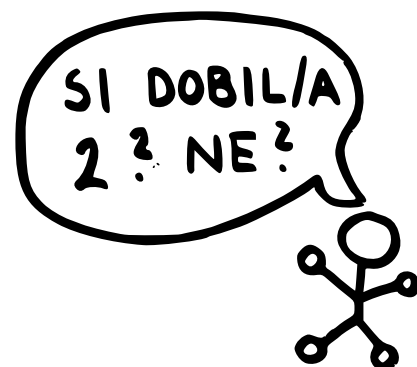


$$V - P + D = \underline{\hspace{2cm}}$$

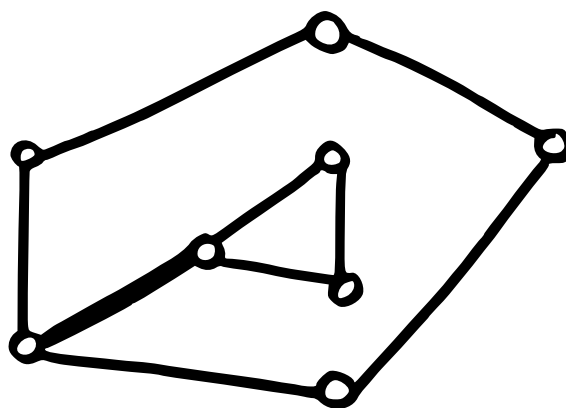
POSKUSI ŠE TA GRAF:



$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$



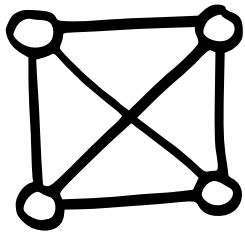
TA GRAF NI POVEŽAN.  
GRAF LAHKO POVEŽEMO  
TAKO, DA DODAMO  
POVEŽAVO.



$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$

ZDAJ DELUJE!

# KAJ PA TA GRAF?

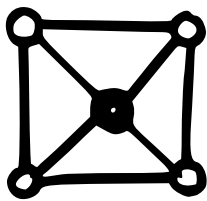


$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$

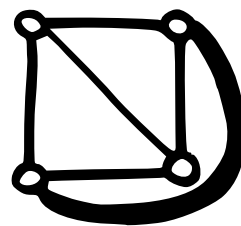


V TEM GRAFU SE DIAGONALNE POVEZAVE SEKAJO. POSKUSIMO TO POPRAVITI.

DODAJMO VOZLIŠČE



PREMAKNIMO POVEZAVO



$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$

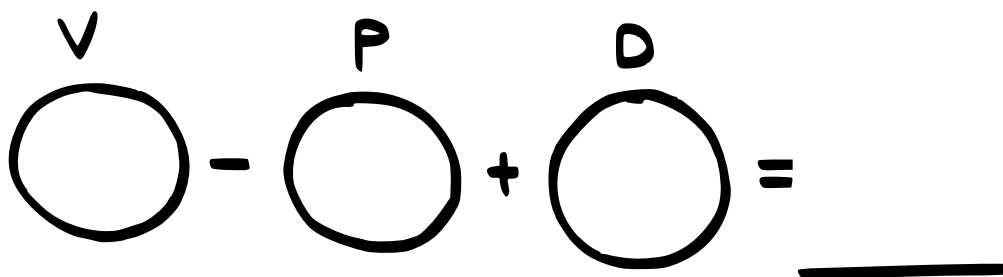
$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$

## ZDAJ DELUJE!

RAVNINSKI GRAF LAHKO NARIŠEMO TAKO, DA SE POVEZAVE MED SEBOJ NE SEKAJO.

GRAF POSKUSI NARISATI  
SAM/A!

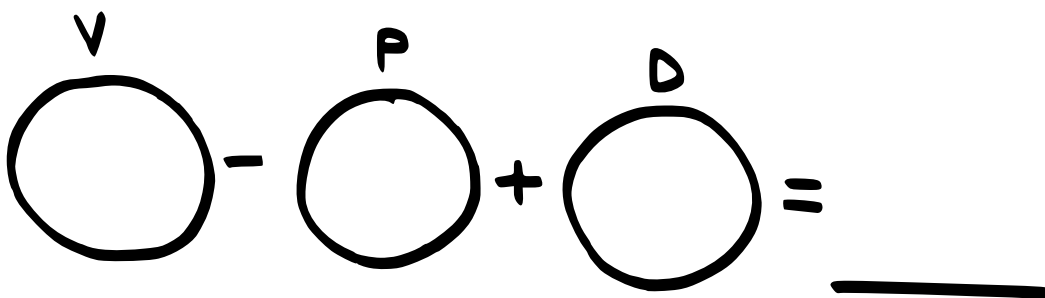
MOJ GRAF:



MOJ GRAF:

$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$

# MOJ GRAF:



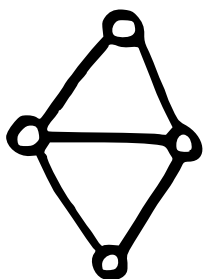
ALI JE ZA POVEŽAN  
RAVNINSKI GRAF EULERJEVA  
KARAKTERISTIKA VEDNO 2?  
JA!

• ZAČNE SE PRAVILNO

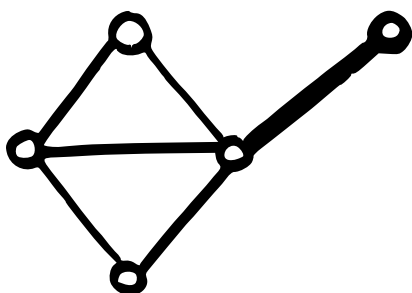
○ ENO VOZLIŠČE  
NI POVEŽAV  
EN DEL

$$\overset{V}{\bigcirc} - \overset{P}{\bigcirc} + \overset{D}{\bigcirc} = \underline{\hspace{2cm}}$$

- OSTANE RES, KO GRAFU DODAMO VOŽLIŠČE.



PREJ



POTEM

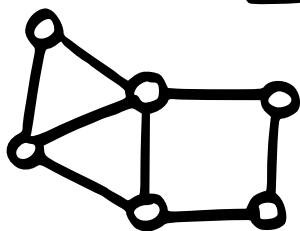
ENO NOVO  
VOŽLIŠČE

ENA NOVA  
POVEŽAVA

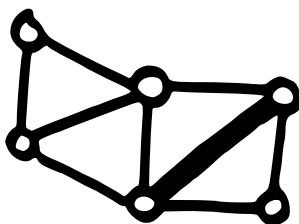
$$V - P + D = \underline{\quad}$$

NA NOVO DODANO VOŽLIŠČE IN NJEGOVA  
POVEŽAVA SE ODŠTEJETA

- OSTANE RES KO DEL  
PREPOLOVIMO Ž NOVO  
POVEŽAVO.



PREJ



POTEM

ENA NOVA  
POVEŽAVA  
EN NOV  
DEL

$$V - P + D = \underline{\quad}$$

NOVA POVEŽAVA IN DODATNI  
DEL SE ODŠTEJETA