

TRC ESERCA CONCETTUALI

$m \in \mathbb{Z}^+$   $m = \{1, 2, \dots, m\}$

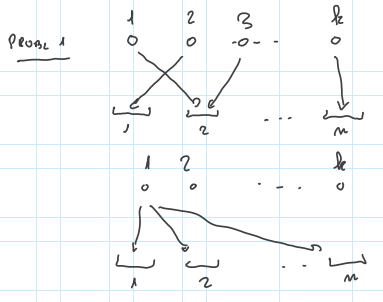
PROBLEMA 1  $\# \{ F: \underline{k} \rightarrow \underline{m} \} = ?$

PROBL 2  $\# \{ F: \underline{k} \xrightarrow{1-1} \underline{m} \}$

PROBL 3  $\# \{ F: \underline{k} \xrightarrow{su} \underline{m} \}$

Ricordo i)  $F: \underline{k} \xrightarrow{1-1} \underline{m} \Leftrightarrow (F(i) = F(j) \Rightarrow i = j)$   
 ii)  $F: \underline{k} \xrightarrow{su} \underline{m} \Leftrightarrow \nexists \text{ per } \exists v \in \underline{k} \text{ t.c. } F(i) = v$

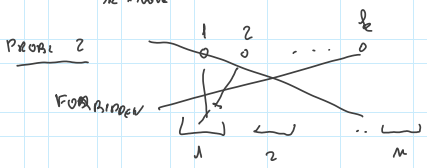
MONTELO PER OCCUPAZIONI  $F: \underline{k} \rightarrow \underline{m}$



Henze:  
 $\# \{ F: \underline{k} \rightarrow \underline{m} \} = ?$   
 $\stackrel{\text{sol}}{=} m^k$

PER LA BIRIA 1  
 ho m scelte,  
 PER LA BIRIA 2  
 ho m .. scelte  
 PER k ho m .. scelte.

$\underbrace{m \cdot m \cdot \dots \cdot m}_{k \text{ volte}} = m^k$



$F: \underline{k} \xrightarrow{1-1} \underline{m}$   
 MA: DUE BIRIE  
 VANNO NESSA  
 STESSA URTA

$\# \{ F: \underline{k} \xrightarrow{1-1} \underline{m} \}$

1 2 3 ... k  
 0 0 0 .. 0

1 2 3 ... m

PER 1 HO  
 m scelte  
 PER 2 HO  
 m-1  
 PER k HO m-k+1 scelte

$\# \{ F: \underline{k} \xrightarrow{1-1} \underline{m} \} = \underline{m(m-1) \dots (m-k+1)}$

$$m(m-1)\dots(m-k+1) = \binom{m}{k}$$

"FATTORIALE" DECRESCENTE  
DI M FINO A k.

$$\binom{m}{m} = m(m-1)\dots 1 = m!$$

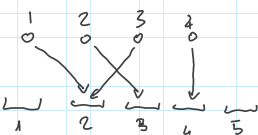
MODELLO DELLE PAROLE

$$F: k \rightarrow m$$

$$w(F): \begin{array}{ccccccc} & \text{F(1)} & \text{F(2)} & \dots & \text{F(k)} & & \\ \hline & 1 & 2 & 3 & & & k \end{array}$$

$$k=2, m=5 \quad F(1)=2, F(2)=3, F(3)=2, F(4)=4$$

DEE  
MODEL



WORD

$$w(F): \begin{array}{cccc} 2 & 3 & 2 & 4 \\ \hline 1 & 3 & 3 & 4 \end{array} = 2324$$

PROB 1 DAL PTO DI VISTA DELLE PAROLE

$$F: k \rightarrow m$$

$$w(F): \begin{array}{cccc} & \text{m mod} & & \text{m mod} \\ \hline & 1 & 2 & k \end{array}$$

$$\Rightarrow m \text{ mod}$$

$$\# \{ F: k \rightarrow m \} = m^k$$

$$\# \{ F: k \xrightarrow{1-1} m \} = m(m-1)\dots(m-k+1) = \binom{m}{k}$$

$$w(F): \begin{array}{cccc} \text{m-1} & & & \text{m-k+1} \\ \hline 1 & 2 & & k \end{array}$$

SENZA LETTERE RIPETUTE!!

ANNUNCIAMO LA SOL NEL PROBC 3

$$\# \{ F: k \xrightarrow{1-1} m \} = \sum_{j=0}^m (-1)^{m-j} \binom{m}{j} j^k$$

X

UNA CLASSE DI k STUDENTI, SCEGLIA LA

PROBABILITA'

P(E) OVE E E' L'EVENTO:

E DEF VISOLO ALMENO 2 STUDENTI CON LA  
STESSA DATA DI COMPLEANNO.

LA "DATA DI NASCITA"

$F: k = \{1, 2, \dots, b\} \rightarrow 365$  spazio campione

L'evento  $E = \{F: k \rightarrow 365; F \text{ non invertiva}\}$ .

LA SOL. SARA'  $P(E^c)$

$E^c: \{F: k \rightarrow 365; F \text{ invertiva}\}$

$$\text{sol} = P(E) = 1 - P(E^c) =$$

$$P(E^c) = \frac{(365)_k}{365^k}$$

$$\text{sol} \quad P(E) = 1 - \frac{(365)_k}{365^k}$$

NOTICE THAT  $\text{if } k \geq 23 \Rightarrow P(E) > \frac{1}{2}$ .