

# Wstep do Informatyki

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# Tablice Prawdy Operatorów Logicznych

## Operator OR

A	B	A OR B
0	0	0
0	1	1
1	0	1
1	1	1

## Operator AND

A	B	A AND B
0	0	0
0	1	0
1	0	0
1	1	1

## Operator XOR

A	B	A XOR B
0	0	0
0	1	1
1	0	1
1	1	0

## Operator NOT

A	NOT A
0	1
1	0

# Wzory Matematyczne

- ▶ Ilość informacji:

$$I(x) = -\log_2(P(x))$$

- ▶ Entropia informacyjna źródła informacji:

$$H(X) = -\sum_{i=1}^n P(x_i) \log_2 P(x_i)$$

- ▶ Średnia długość słowa kodowego:

$$L = \sum_{i=1}^n P(x_i) \cdot I(x_i)$$

- ▶ Względna redundancja kodu:

$$R = \frac{H(X) - \min(L)}{H(X)}$$

# Algorytm Shannona-Fano

1. Przygotuj liste symboli i ich prawdopodobieństw.
2. Posortuj symbole według prawdopodobieństw.
3. Podziel liste na dwie części tak, aby suma prawdopodobieństw w każdej z nich była jak najbardziej równa.
4. Przypisz 0 do jednej części, a 1 do drugiej.
5. Powtarzaj proces dla każdej z części, aż każdemu symbolowi przypiszesz kod.

# Metody Kompresji w 7-Zip

- ▶ ZIP
- ▶ GZIP
- ▶ BZIP2
- ▶ XZ
- ▶ TAR
- ▶ 7z

# Algorytm Komputerowy Ady Lovelace

Diagram for the computation by the Engine of the Numbers of Bernoulli. See Note G. (page 77 of seq.)

Number of Bernoulli	Variable	Variable	Variable	Variable	Statement of Results.	Working Formulae.										Result Formulae.																																																																																					
						$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{1}{11}$	$\frac{1}{12}$	$\frac{1}{13}$	$\frac{1}{14}$	$\frac{1}{15}$																																																																																		
1	$B_0 = 1$	$B_1 = \frac{1}{2}$	$B_2 = \frac{1}{6}$	$B_3 = \frac{1}{42}$	$B_4 = \frac{1}{420}$	$B_5 = \frac{1}{42}$	$B_6 = \frac{1}{420}$	$B_7 = \frac{1}{42}$	$B_8 = \frac{1}{420}$	$B_9 = \frac{1}{42}$	$B_{10} = \frac{1}{420}$	$B_{11} = \frac{1}{42}$	$B_{12} = \frac{1}{420}$	$B_{13} = \frac{1}{42}$	$B_{14} = \frac{1}{420}$	$B_{15} = \frac{1}{42}$	$B_{16} = \frac{1}{420}$	$B_{17} = \frac{1}{42}$	$B_{18} = \frac{1}{420}$	$B_{19} = \frac{1}{42}$	$B_{20} = \frac{1}{420}$	$B_{21} = \frac{1}{42}$	$B_{22} = \frac{1}{420}$	$B_{23} = \frac{1}{42}$	$B_{24} = \frac{1}{420}$	$B_{25} = \frac{1}{42}$	$B_{26} = \frac{1}{420}$	$B_{27} = \frac{1}{42}$	$B_{28} = \frac{1}{420}$	$B_{29} = \frac{1}{42}$	$B_{30} = \frac{1}{420}$	$B_{31} = \frac{1}{42}$	$B_{32} = \frac{1}{420}$	$B_{33} = \frac{1}{42}$	$B_{34} = \frac{1}{420}$	$B_{35} = \frac{1}{42}$	$B_{36} = \frac{1}{420}$	$B_{37} = \frac{1}{42}$	$B_{38} = \frac{1}{420}$	$B_{39} = \frac{1}{42}$	$B_{40} = \frac{1}{420}$	$B_{41} = \frac{1}{42}$	$B_{42} = \frac{1}{420}$	$B_{43} = \frac{1}{42}$	$B_{44} = \frac{1}{420}$	$B_{45} = \frac{1}{42}$	$B_{46} = \frac{1}{420}$	$B_{47} = \frac{1}{42}$	$B_{48} = \frac{1}{420}$	$B_{49} = \frac{1}{42}$	$B_{50} = \frac{1}{420}$	$B_{51} = \frac{1}{42}$	$B_{52} = \frac{1}{420}$	$B_{53} = \frac{1}{42}$	$B_{54} = \frac{1}{420}$	$B_{55} = \frac{1}{42}$	$B_{56} = \frac{1}{420}$	$B_{57} = \frac{1}{42}$	$B_{58} = \frac{1}{420}$	$B_{59} = \frac{1}{42}$	$B_{60} = \frac{1}{420}$	$B_{61} = \frac{1}{42}$	$B_{62} = \frac{1}{420}$	$B_{63} = \frac{1}{42}$	$B_{64} = \frac{1}{420}$	$B_{65} = \frac{1}{42}$	$B_{66} = \frac{1}{420}$	$B_{67} = \frac{1}{42}$	$B_{68} = \frac{1}{420}$	$B_{69} = \frac{1}{42}$	$B_{70} = \frac{1}{420}$	$B_{71} = \frac{1}{42}$	$B_{72} = \frac{1}{420}$	$B_{73} = \frac{1}{42}$	$B_{74} = \frac{1}{420}$	$B_{75} = \frac{1}{42}$	$B_{76} = \frac{1}{420}$	$B_{77} = \frac{1}{42}$	$B_{78} = \frac{1}{420}$	$B_{79} = \frac{1}{42}$	$B_{80} = \frac{1}{420}$	$B_{81} = \frac{1}{42}$	$B_{82} = \frac{1}{420}$	$B_{83} = \frac{1}{42}$	$B_{84} = \frac{1}{420}$	$B_{85} = \frac{1}{42}$	$B_{86} = \frac{1}{420}$	$B_{87} = \frac{1}{42}$	$B_{88} = \frac{1}{420}$	$B_{89} = \frac{1}{42}$	$B_{90} = \frac{1}{420}$	$B_{91} = \frac{1}{42}$	$B_{92} = \frac{1}{420}$	$B_{93} = \frac{1}{42}$	$B_{94} = \frac{1}{420}$	$B_{95} = \frac{1}{42}$	$B_{96} = \frac{1}{420}$	$B_{97} = \frac{1}{42}$	$B_{98} = \frac{1}{420}$	$B_{99} = \frac{1}{42}$	$B_{100} = \frac{1}{420}$

Rysunek: Ada Lovelace, pionierka w dziedzinie algorytmów komputerowych.

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