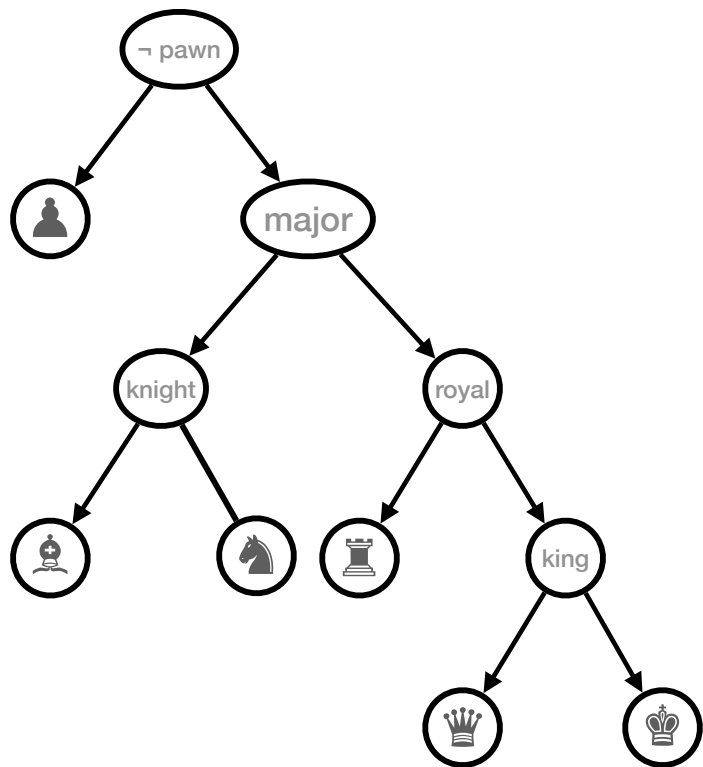
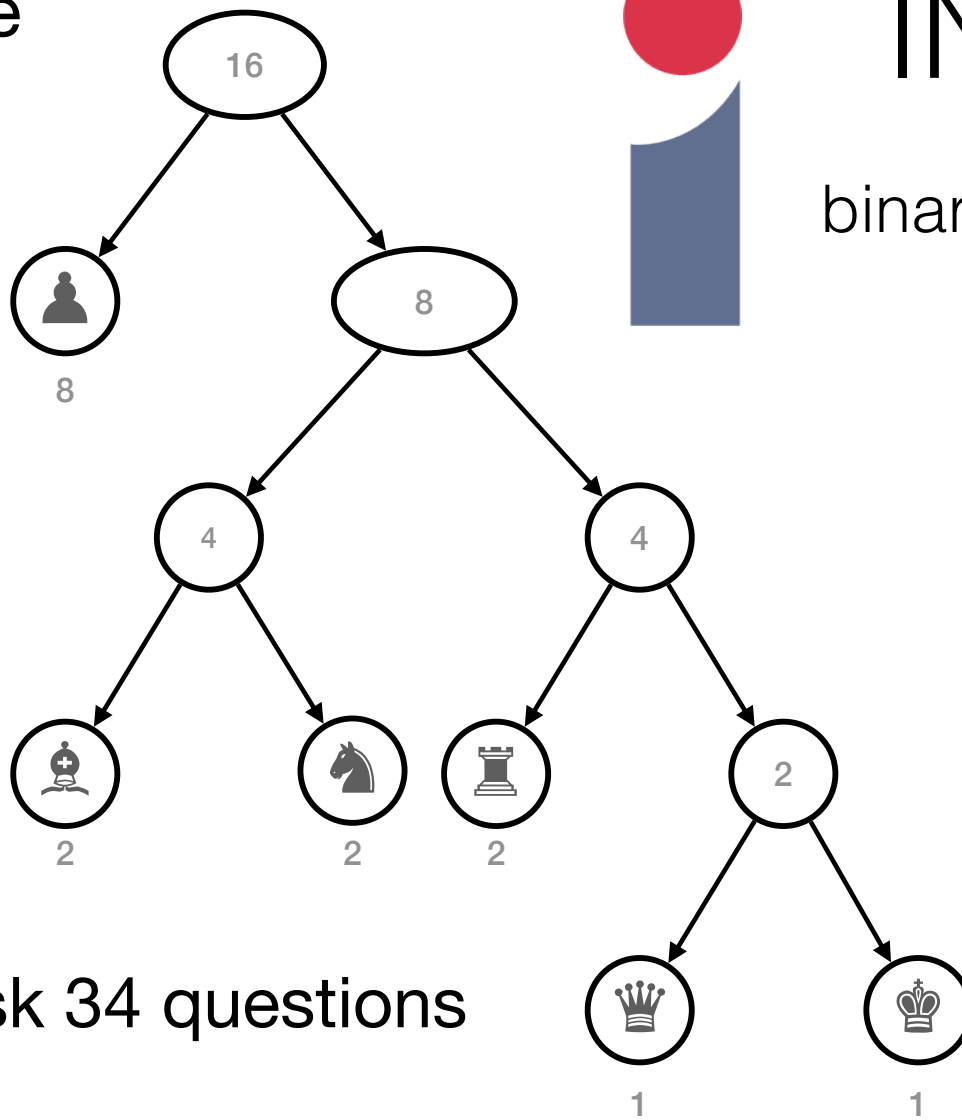


decision tree



to check every piece, ask 34 questions



INF1A

binary questions

 0

 100

 101

 110

 1110

 1111

We can choose any binary encoding.



000



001



010



100



110



111

Each bit corresponds to some yes-no question.

With 3 bits we can encode 8 values. We can choose six codes to represent our 6 kinds of chess piece.

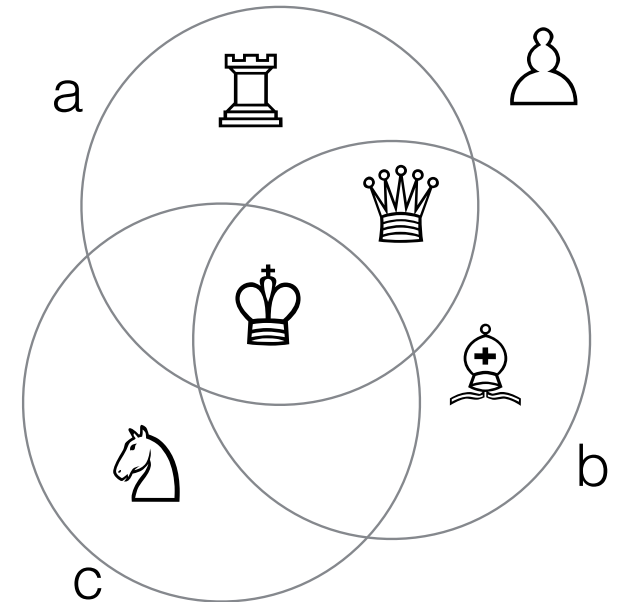
What are the questions corresponding to this encoding?



INF1A

encodings

Venn diagram





INF1A

encodings

 000

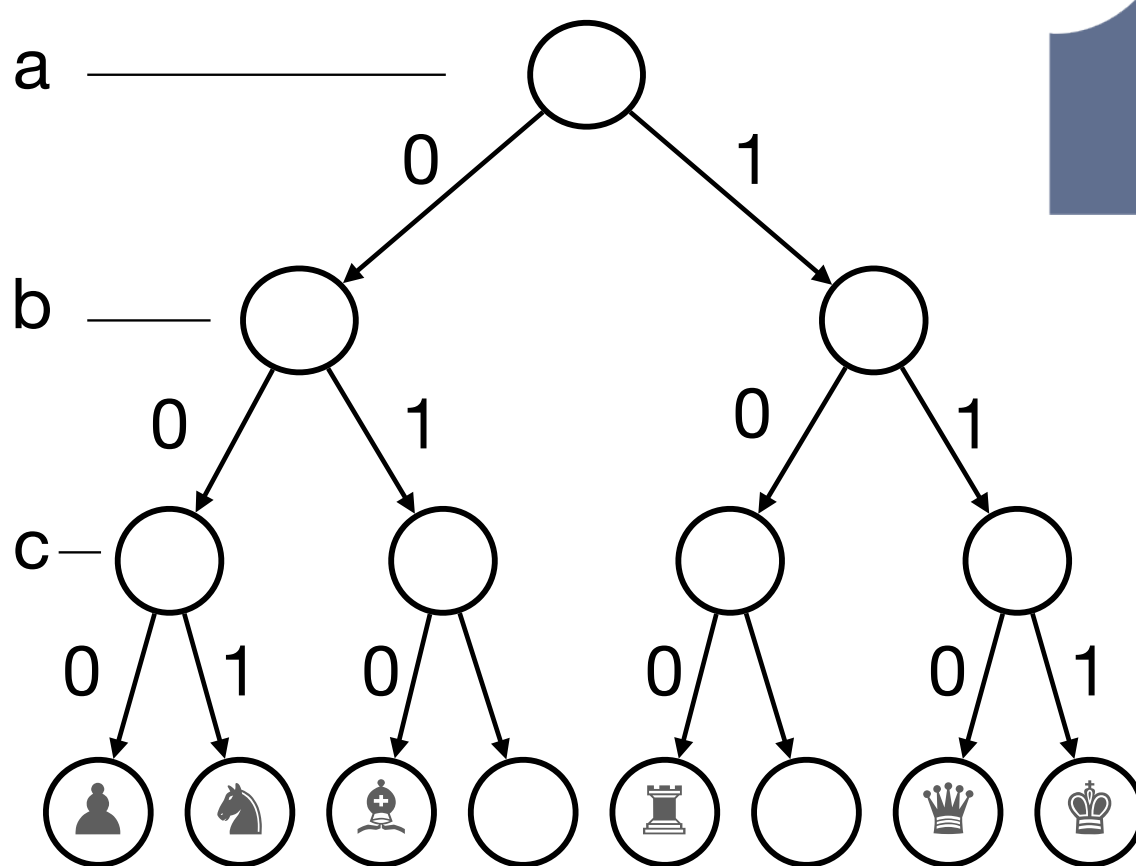
 001

 010

 100

 110

 111

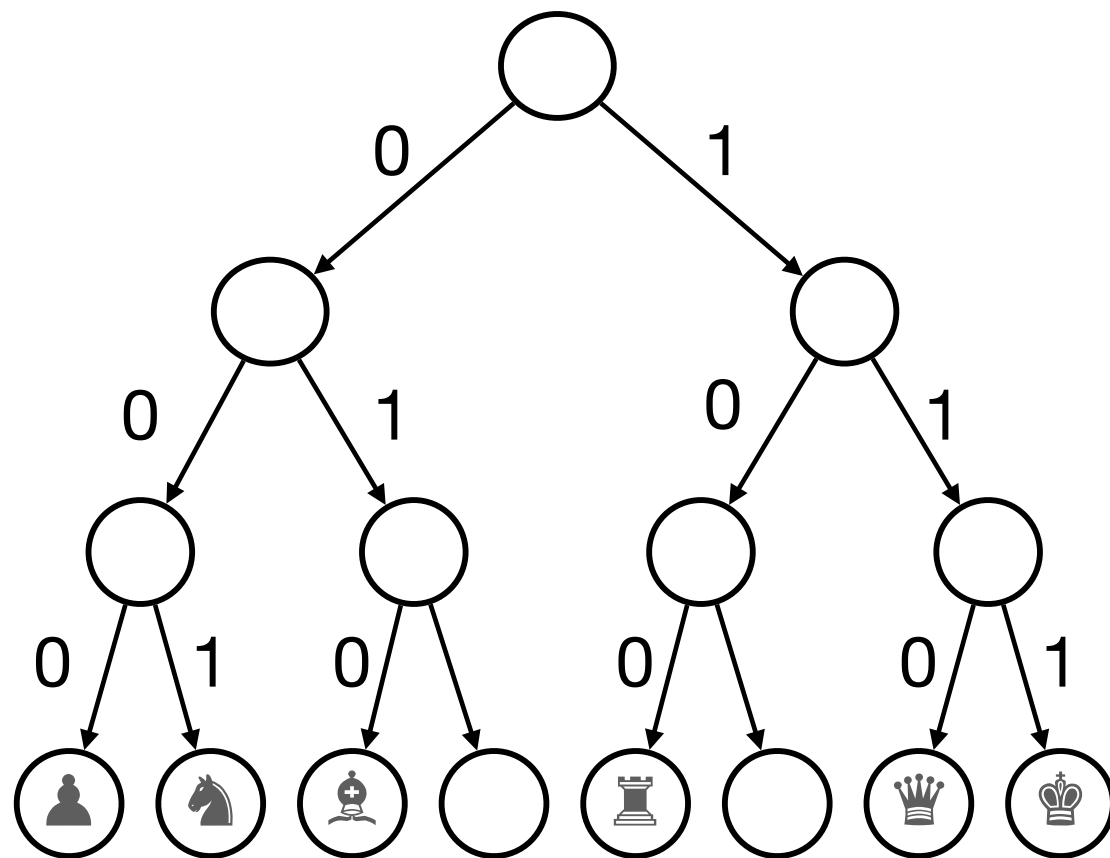


encoding abc

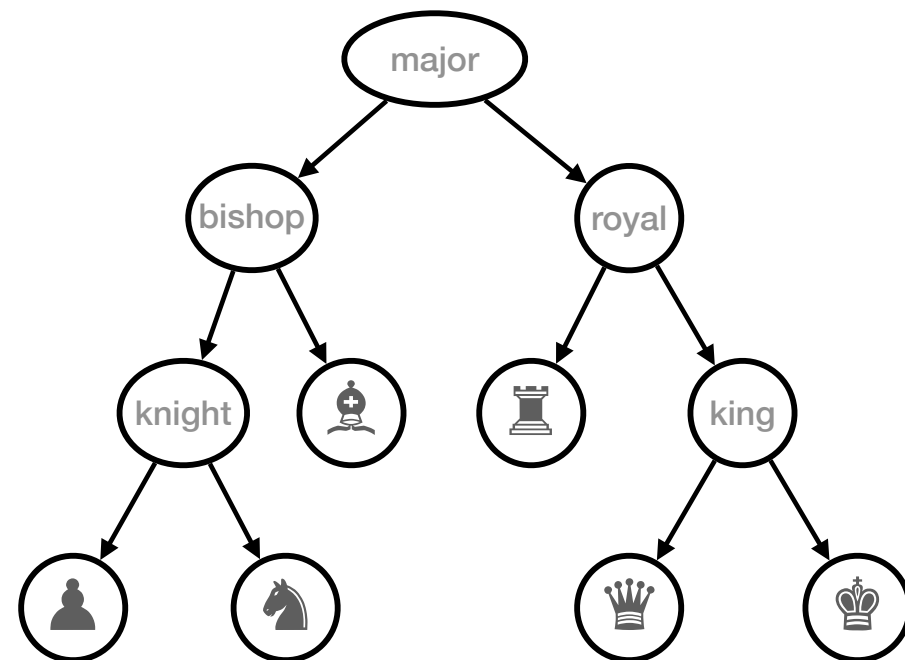


INF1A

encodings



encoding

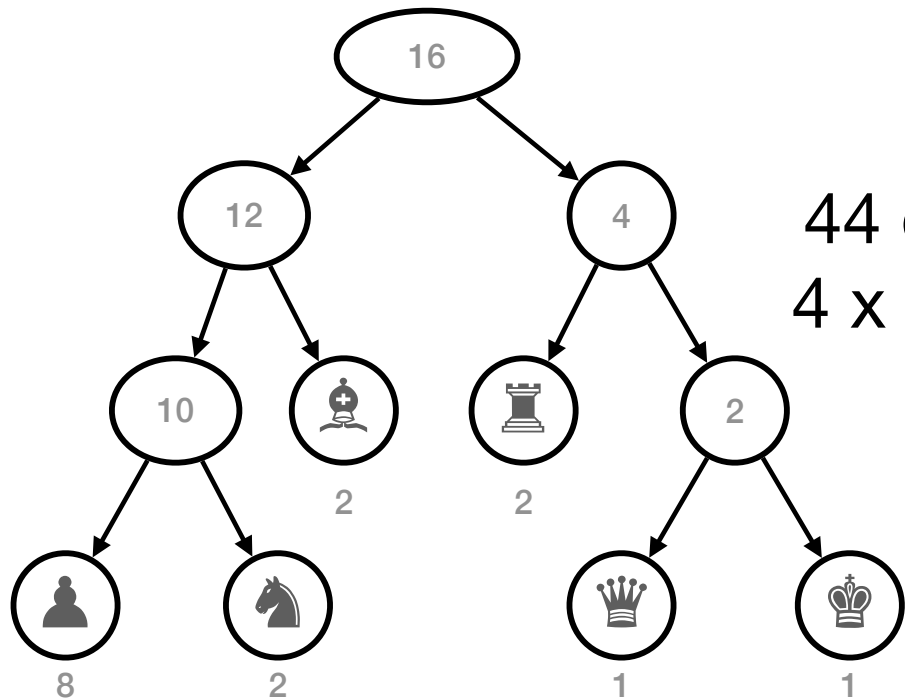


decision tree

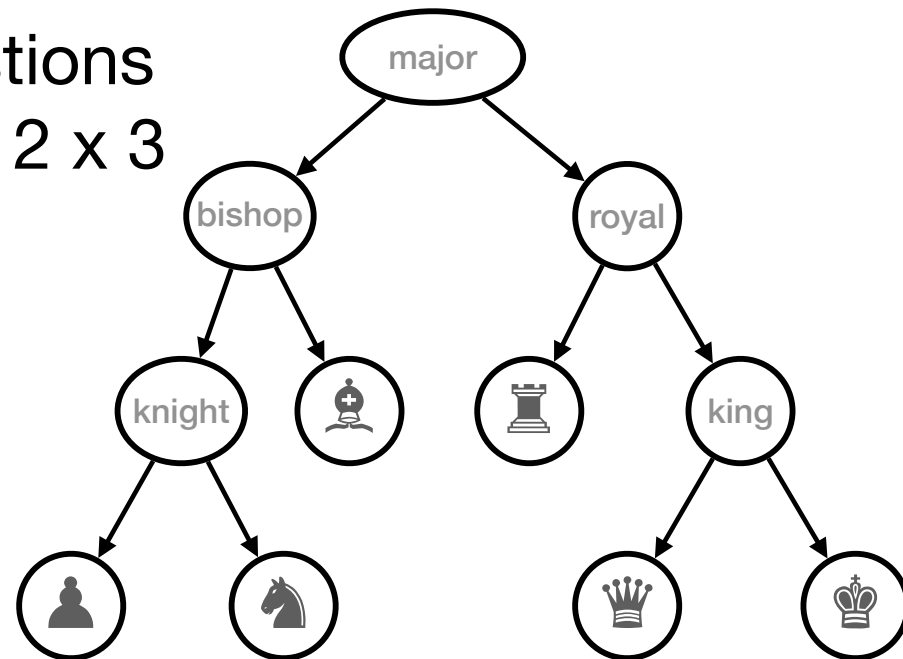


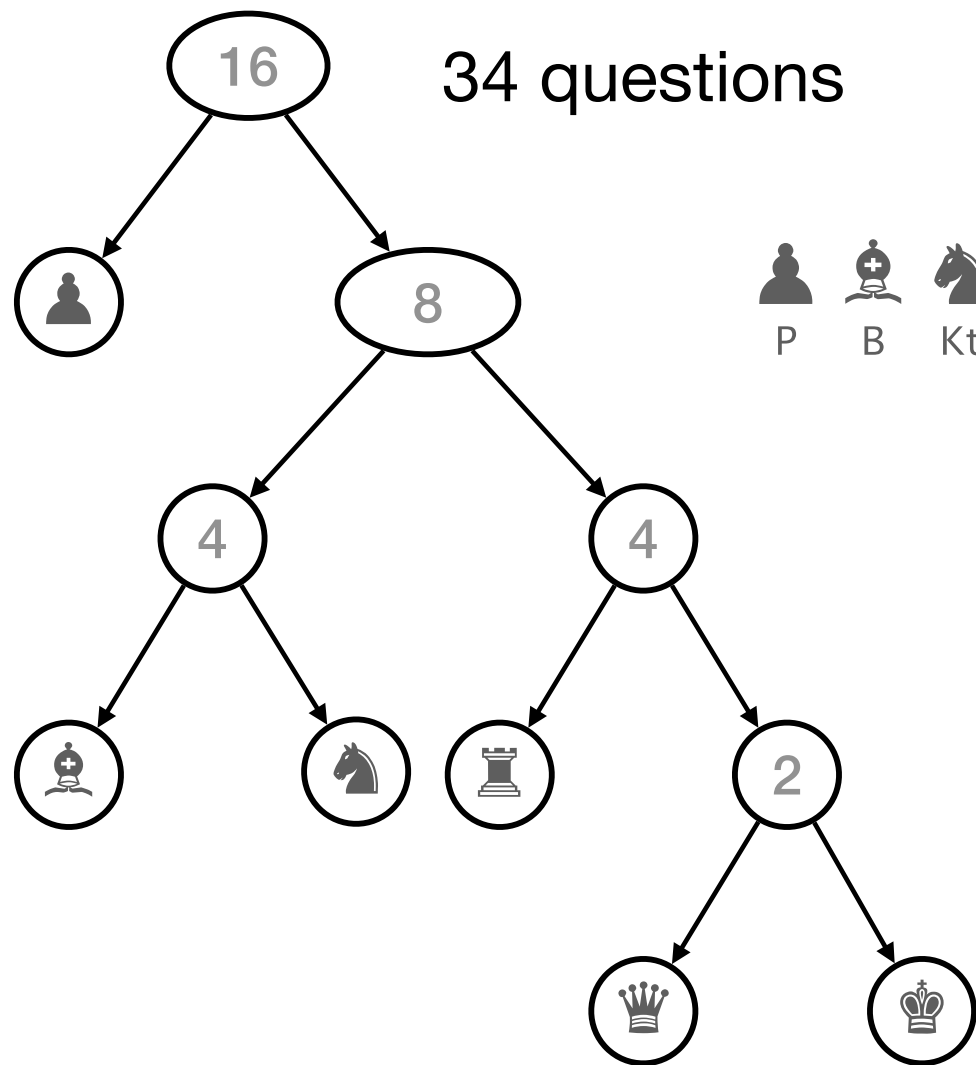
INF1A

encodings



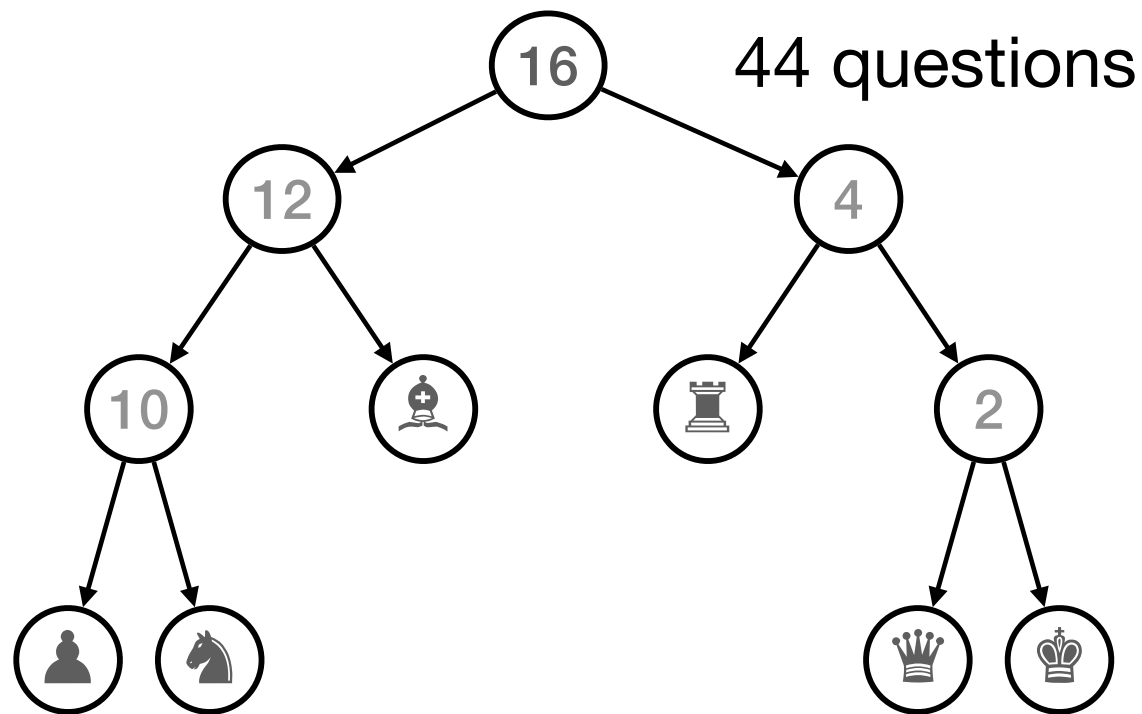
44 questions
 $4 \times 2 + 12 \times 3$

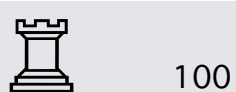
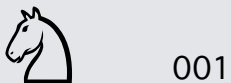




INF1A

encodings





INF1A

encodings

With **3** bits we can encode 8 values.

How many bits do we need to encode **n** values?

Hint: What is the binary representation of 42 ?
How many bits do we need to encode 42 values?

How many ways can we encode 3 values
using two bits?

We can encode 3 values
with 2 bits in $4 \times 3 \times 2 = 24$ ways
(2 ways shown here)

There are many!



INF1A

encoding

yes	10	10
maybe	00	01
no	01	11

