

Computing

Lesson 3: Binary Digits

Representations- from Clay to Silicon

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Task 1 - Name the symbols

What do we call these symbols?

How many of them are there?

a b c d e f g h i j
k l m n o p q r s t
u v w x y z

Answer:-



Task 2 - Count the text length

cat

Write answers below

1. What is the **length** of this word?
(How many symbols does it contain?)

▷ length:

2. Can you give another example of a
3-letter word?

▷ examples:



Task 3 - What are these symbols?

1. What do we call these symbols?

2. How many of them are there? 0 1 2 3 4 5 6 7 8 9

Write answer below:



Task 4 - Count the symbols

314

Answers below:

What is the **length** of this number?
(How many symbols does it contain?)

▷ length:

Can you give another example of a
3-digit number?

▷ examples:-

How many 3-digit numbers can there
possibly be?

▷ 3-digit numbers:



Task 5 - Counting the bits

How many binary digits does it take to represent the message:

See you tonight?

Hint: Spaces are characters too!



Task 6 - Counting the bits (Solution)

A single text message is restricted to contain at most 1120 bits.

What is the **maximum number of characters** in a single text message?

Hint: How many 7-bit sequences can fit into 1120 bits?



Task 7: Counting 7-bit sequences

ASCII uses sequences of 7 bits to represent characters.

How many **different characters** can be encoded using 7 bits?

Answer:

Are these maximum possible characters **enough to encode letters, digits, and symbols?**

Answer:

Hint: How many 7-bit sequences are possible?



Task 8: Counting 8-bit sequences

Many 8-bit coding schemes are based on 7-bit ASCII

Using an additional bit **doubles** the number of possible characters from 128 (7-bit) to 256 (8-bit).

Answer:

Why do you think it was necessary to **extend** the original 7-bit code with an additional binary digit?

