

Broke Spies

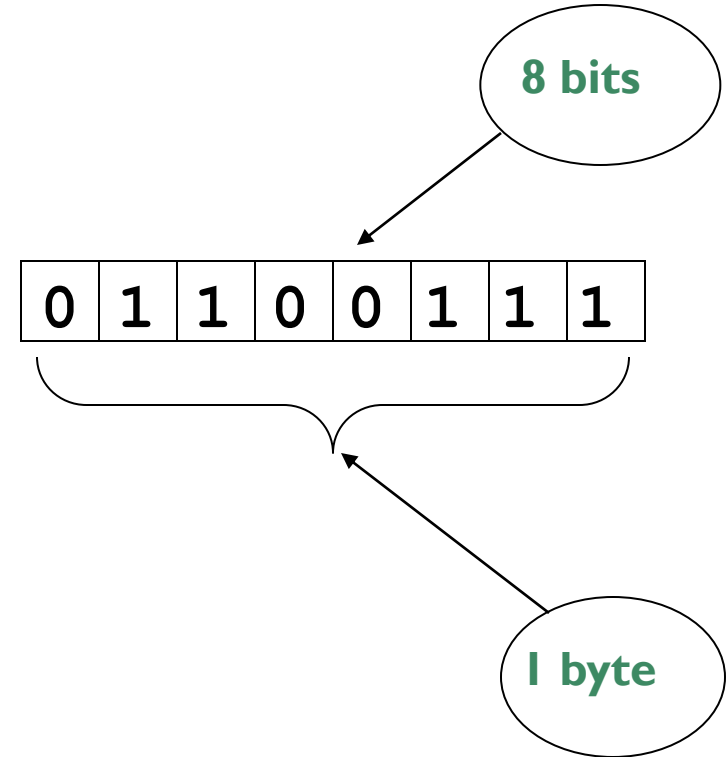
- ▶ Problem: You are a spy going into an evil party to find the super-secret code phrase (made up of letters and spaces), which you will immediately send via text message to your team to prevent, oh, let's say a volcano from destroying the Earth. Unfortunately, you're a poor spy and your phone can only type digits (0-9). It can't even type spaces!

Quickly! Before you are sent in, figure out what you can tell your team that will allow you to get the code phrase out to them.



Main Memory Organization

- ▶ **Bit**
 - ▶ Smallest piece of memory
 - ▶ Stands for **binary digit**
 - ▶ Has values 0 (off) or 1 (on)
- ▶ **Byte**
 - ▶ Is 8 consecutive bits
- ▶ **Word**
 - ▶ Usually 4 consecutive bytes
 - ▶ Has an address



Data Storage and Encoding

- ▶ All data is stored in binary bits in main memory
- ▶ The meaning of a set of bits depends on the *encoding*
 - ▶ Encoding determines the length of a meaningful chunk
 - ▶ We use bytes (8-bits) as our most common unit
 - ▶ Encoding also determines how those bits should be read

8-bit Binary	8-bit Integer	8-bit Character (ASCII)
0100 0001	65	'A'
0100 0010	66	'B'
0100 0011	67	'C'



Data Conversion

- ▶ Python built-in ASCII data type converters

```
>>> letter = 'a'
```

```
>>> ord(letter)
```

```
97
```

```
>>> chr(97)
```

```
'a'
```

