Scalas Data Types

Booleans

The Boolean Data Type is a data type, having two values (usually denoted true or false), intended to represent the truth values of logic and Boolean Algebra.

**Specification:** In Pascal and Ada, the Boolean datatye is considered a language-defined enumeration, viz;

```
type Boolean = (false, true);
```

Which both defines the names true and false for the values of the types and defines ordering false < true.

Common operations are

- **And**: `Boolean x Boolean -> Boolean` (Conjunction)
- **Or**: `Boolean x Boolean -> Boolean` (Inclusive disjunction)
- **Not**: `Boolean -> Boolean` (negative or complement)

**Implementation:**

Single bit of storage is provided, no descriptor designated the data type is needed. Because single bits may not be separately addressable in memory, which often takes a byte or word to represent if extended.

Then the values true and false might be represented

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In two ways within this storage unit:

1. A particular bit is used for the value (often the sign bit of the number representation), with 0 = false, 1 = true, and the rest of the byte or word ignored, or

2. A zero value in the entire storage unit represents false, and any other non-zero value represents true.

If this is a particular bit which is to be considered:

- 0 = false
- 1 = true

\[
\begin{array}{ccccccc}
0 & 1 & 0 & 0 & 1 & 0 & 1 & 0 \\
\end{array}
\]

Ignored

\[
\begin{array}{cccccccccccc}
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\end{array}
\]

\[
\begin{array}{cccccccc}
1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
\end{array}
\]