

## Chapter 1 outline:

- ▶ Introduction, sets and elements (last week Wednesday)
- ▶ Set operations; visual verification of set propositions (last week Friday)
- ▶ Introduction to SML; cardinality and Cartesian products (Monday)
- ▶ Making types and functions in SML (**Today**)
- ▶ More about functions in SML; introduction to lists [Chapter 2] (Friday)

## Today: *Making stuff in SML*

- ▶ A few follow-up points from last time
- ▶ Making our own types
- ▶ Making our own operations

**1.8.6** Describe three distinct partitions of the set  $\mathbb{Z}$ .

**1.9.5** Based on our description of the real number plane as a Cartesian product, explain how a line can be interpreted as a set.

**1.9.6** Explain how  $\mathbb{C}$ , the set of complex numbers, can be thought of as a Cartesian product.

**1.9.7** Any rational number (an element of set  $\mathbb{Q}$ ) has two integers as components. Why not rewrite fractions as ordered pairs (for example,  $\frac{1}{2}$  as  $(1, 2)$  and  $\frac{3}{4}$  as  $(3, 4)$ ) and claim that  $\mathbb{Q}$  can be thought of as  $\mathbb{Z} \times \mathbb{Z}$ ? Explain why these two sets *cannot* be thought of as two different ways to write the same set. (There are at least two reasons.)

```
#1(5, 4) + int(4.0 / 3.1)
```

```
(5 + 7, String.sub("hello", 2))
```

$$\begin{aligned}
 &(((\underbrace{1}_{\text{int}}, \underbrace{2}_{\text{int}}), \underbrace{5.7}_{\text{real}}, (\underbrace{\# "A"}_{\text{char}}, \underbrace{\# "x"}_{\text{char}})), \underbrace{8}_{\text{int}}, \underbrace{"bye"}_{\text{string}}) \\
 &\quad \underbrace{\hspace{1.5cm}}_{\text{int} * \text{int}} \quad \underbrace{\hspace{1.5cm}}_{\text{char} * \text{char}} \\
 &\quad \underbrace{\hspace{2.5cm}}_{(\text{int} * \text{int}) * \text{real} * (\text{char} * \text{char})} \\
 &\quad \underbrace{\hspace{3.5cm}}_{((\text{int} * \text{int}) * \text{real} * (\text{char} * \text{char})) * \text{int} * \text{string}}
 \end{aligned}$$

**For next time:**

*Pg 36: 1.9.(14 & 16)*

*Pg 40: 1.10.(1-4)*

*SML problems should still be submitted on paper with the rest of the assignment.*

*Re-read 1.11 (if necessary)*

*Skim 1.(12 & 13).*

*Read 2.1 (focus on this one)*

*Skim 2.2*

*Take quiz*