### Syntax:

Read Chap 5

### Example (default type int):

```
- fun add2 (a,b) = a + b;
val add2 = fn : int * int -> int
tuple
```

function type

### Example (real): function return type

```
- fun add2r (a:real,b:real):real = a + b;
val add2r = fn : real * real -> real
```

### **Using Functions**:

```
- fun add2 (a,b) = a + b;
val add2 = fn : int * int -> int
- add2(1,2);
val it = 3 : int
```

Example: write a function that computes the negative of a real value.

```
- fun neg(v:real):real = v * ~1.0;
val neg = fn : real -> real
```

<u>Example</u>: write a function that computes the sum of the elements of a list of integers. (Hint: use recursion)

#### Cases:

$$[1,2,3,4,5] \rightarrow 15$$
  
 $[6,12] \rightarrow 18$   
 $[7] \rightarrow 7$   
 $[] \rightarrow 0$ 

recursion!

Example: write a function that computes the length of a list.

```
Cases: [1,2,3] \rightarrow 3 [1,2] \rightarrow 2 [1] \rightarrow 1 [] \rightarrow 0
```

Example: write a function that will reverse the order of the elements in a list.

#### Cases:

```
[1,2,3] \rightarrow [3,2,1]

[1] \rightarrow [1]

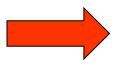
[] \rightarrow []
```

- Write a function red3 of type 'a \* 'b \* 'c -> 'a \* 'c that converts a tuple with three elements into one with two by eliminating the second element.
- Write a function thirds of type string -> char that returns the third character of a string (your function does not need to be defined on strings with length less than 3), Hint: use the explode function.
- Write a function *del3* of type *'a list -> 'a list* whose output list is the same as the input list, but with the third element deleted (your function does not need to be defined on lists with length less than 3).
- Write a function sqsum of type int -> int that takes a non-negative integer
  n and returns the sum of the squares of all the integers 0 through n (your
  function does not need to be defined for inputs < 0).</li>
- Write a function sort3 of type real \* real \* real -> real list that returns a sorted list of three numbers.
- Write a function pow of type real \* int -> real that raises a real number to an integer power (your function does not need to be defined for integer values less than 0)

- Some pragmatics for ML:
  - You can use your favorite editor to write a program and then load it into ML with
    - use "<filename>";
  - Comments in ML: (\* ... \*)

#### sq.sml

```
(*
 * this program computes the
 * square of a real value
 *)
fun sq (x:real):real = x * x;
```



```
iBook:~ lutz$ sml
Standard ML of New Jersey v110.59
- use "sq.sml";
[opening sq.sml]
val sq = fn : real -> real
val it = () : unit
- sq(3.0);
val it = 9.0 : real
```

Assignment #4 – see website