

PROGRAMMING LANGUAGES RECITATION

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Introduction to Standard ML

Installation

- You can use [this](#) website to download Standard ML.
- Please follow the [instructions](#) to download SML.
- Once installed, type `sml` in your terminal to use SML compiler.
- You can also write a file of your assignment by using `.sml` extension. After named SML source file, open the compiler and type this:
 - `use "<file_name>.sml";`

Basic Syntax

`val <pat> = <exp>`

`fun f <pat> = <exp>`

Example:

`val x = 3`

`val y = x + 1`

`fun fib x = if x < 3 then 1`

`else fib (x - 1) + fib (x - 2)`

Basic Expressions

(* Integers *)

1

~3 (*Negative 3*)

(* Reals *)

3.14

~3.2E3

(* Booleans *)

true

false

(* Strings *)

" This is a string "

Arithmetic expressions

3 + 4

3 + 4.0 (* WRONG x! SML does not support conversion *)

real 3 + 4.0 (* or 3.0 + 4.0 *)

3 <> 4 (* not equal, val it = true : bool *)

Control flow expressions

- if-then-else:

```
(* Format:  
    if <cond> then <exp> else <exp>  
*)
```

```
if true then 3 else false (* WRONG x! types of then branch and else branch should be the same *)
```

- Multiple selection (switch):

```
(* Format:  
    case <exp1> of  
    <pattern_1> => <exp>  
    | <pattern_2> => <exp>  
    | . . . . .  
    | <pattern_n> => <exp>  
*)
```

```
fun compare (x, y) =  
    if x < y then ~1  
    else if x > y then 1  
    else 0;
```

```
case compare(3, 4) of  
    1 => "Greater"  
  | ~1 => "Less"  
  | 0 => "Equal"  
  | _ => "Error input!" ;
```

Midterm Review

- Regular Expressions.
- Grammar.
- Scoping.
- Parameter Passing Techniques.
- Binding Type.
- Scheme.
- Lambda Calculus.