Introduction to Unix and SML

Comp3031 Lab 01
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Unix Machines

- There are 40 Unix machines in UG Lab2 (4214)
  - csl2wk**.cse.ust.hk (**=01..40)
- We access them through SSH on Windows
  - Start->All programs->SSH secure shell->Secure Shell Client
  - Or use putty
  - Type in the host name (one of the 40 machines)
  - Enter CSD account name -> Connect->password

Simple Unix Commands

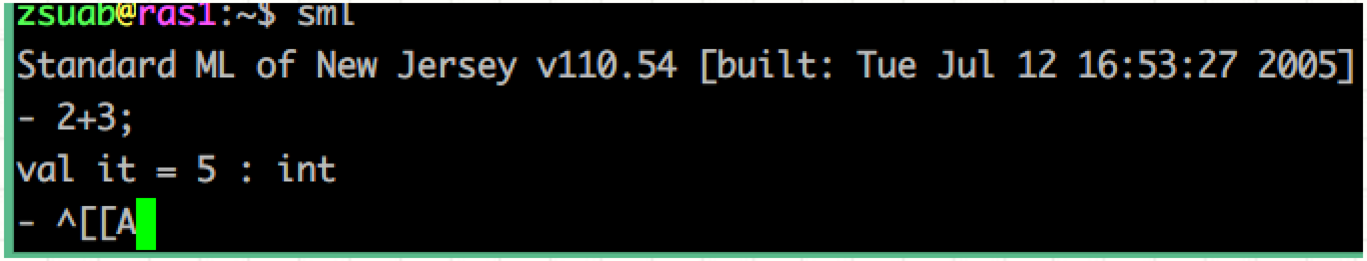
- cd <dir_name>: Go to a directory <dir_name>
- ls : List the directories and files
- emacs/vim: Edit a file/Create a file
- mkdir <dir1>: create a directory <dir1>
- <command_name> --help   info about the command
  - e.g., “mkdir --help” displays info about how to use mkdir

SML (Standard MetaLanguage)

- A functional programming language
- In SSH terminal, type “sml” and hit the “enter” key to enter the sml interpreter.
- A trial of SML:
  - Type in “(1+2)*3;”
  - You will see the output: val it = 9 : int
  - Press “ctrl-D” to exit the sml interpreter.

Readline Support

- SML no “repeat the last command”?
  - When you press “up” button



```
zsuab@ras1:~$ sml
Standard ML of New Jersey v110.54 [built: Tue Jul 12 16:53:27 2005]
- 2+3;
val it = 5 : int
- ^[[A
```

- How to make SML support readline?
  - Use rlwrap
  - Refer to: https://course.cse.ust.hk/comp3031/lab/readlinesupport.htm

SML Basic Data Types

- unit: ()
- int: 1, ~2
- real: 1.0, 3E2
- bool: true, false
- string: “Hello World!”

SML Type - int

- 2+3;
  - val it = 5 : int
- 2-3;
  - val it = ~1 : int
- 2*3;
  - val it = 6 : int
- 2 div 3
  - val it = 0: int
- 2 mod 3;
  - val it = 2 : int

SML Type - real

- 2.0+3.0;
- 2.0-3.0;
- 2.0*3.0;
- 2.0/3.0;
- 2.0<3.0;
- 2.0>3.0;
- 2.0=3.0;

Type Conversion

- real(3);
  - val it = 3.0 : real
- Int.toString(45);
- Real.toString(2.0);
- trunc, floor and ceil:

Input	Output	Input	Output
trunc(3.5);	val it = 3 : int	trunc(~3.5);	val it = ~3 : int
floor(3.5);	val it = 3 : int;	floor(~3.5);	val it = ~4 : int;
ceil(3.5);	val it = 4 : int;	ceil(~3.5);	val it = ~3 : int;

Boolean Expressions

- A Boolean expression evaluates to either true or false.
  - 1<3;   val it = true : bool
  - 1>3;   val it = false : bool
  - 1=3;   val it = false : bool

If-then-else Expression

- if … then … else … is evaluated to either the then branch or the else branch, depending on the if-condition.
  - val time = 13;
    - val time = 13 : int
  - if time > 12 then “go home” else “go to tutorial”;
    - val it = “go home” : string

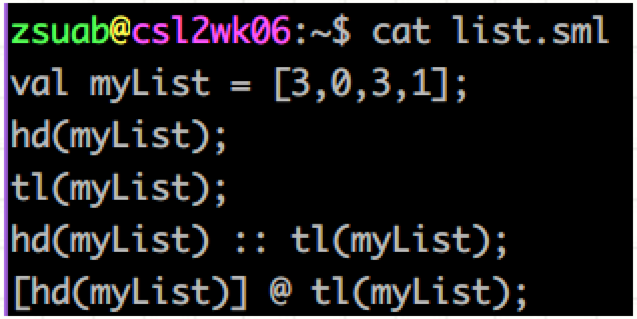
SML - List

- val myList = [3,0,3,1];

  val myList = [3,0,3,1] : int list
- hd(myList);
  - val it = 3: int
- tl(myList);
  - val it = [0,3,1] : int list
- hd(myList) :: tl(myList);
  - val it = [3,0,3,1] : int list
- [hd(myList)] @ tl(myList);
  - val it = [3,0,3,1] : int list

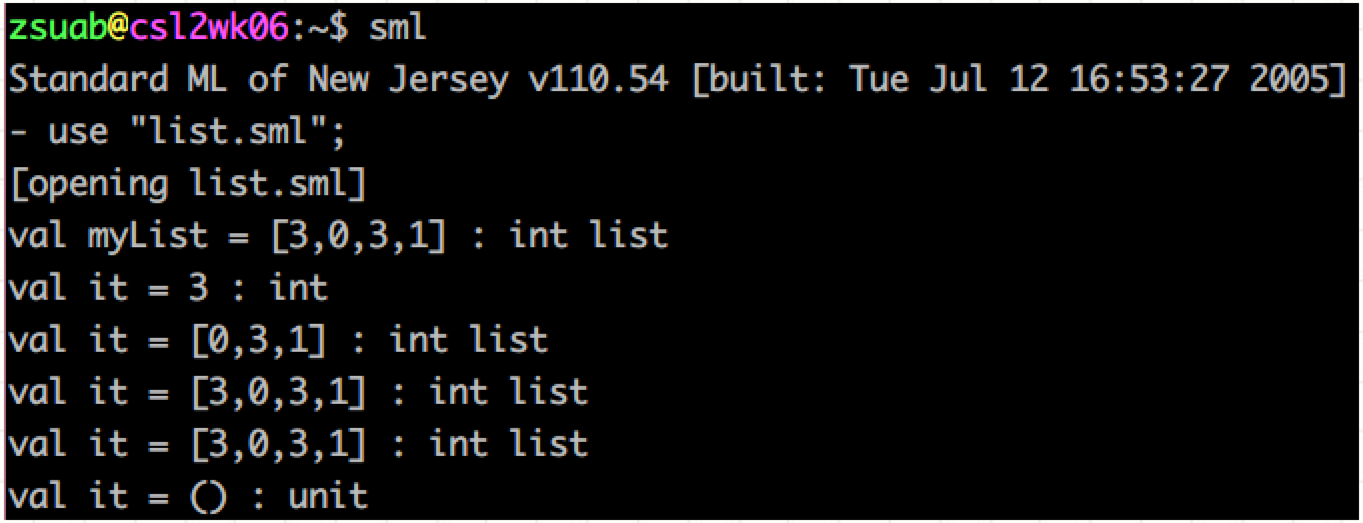
Load & Excute Program

- How to load and execute a program?
  - Edit the program using your preferred editor



```
zsuab@csl2wk06:~$ cat list.sml
val myList = [3,0,3,1];
hd(myList);
tl(myList);
hd(myList) :: tl(myList);
[hd(myList)] @ tl(myList);
```

  - use “filename”;



```
zsuab@csl2wk06:~$ sml
Standard ML of New Jersey v110.54 [built: Tue Jul 12 16:53:27 2005]
- use "list.sml";
[opening list.sml]
val myList = [3,0,3,1] : int list
val it = 3 : int
val it = [0,3,1] : int list
val it = [3,0,3,1] : int list
val it = [3,0,3,1] : int list
val it = () : unit
```

Exercises

- Try the following:
  - {1=2, 2=3};
  - {1="2", 2="3"};
  - hd(1);
  - hd([]);
  - tl([]);
  - [1, 1.0];
  - [1 mod 2];
  - “string”=(“string”);

More Exercises

- Try the following if-then-else expressions:
  - if 2=3 then {} else ();
  - if 2=3 then {} else {1=2};
  - if 2=3 then () else (1,2);
  - if 2=3 then () else [1,2];
  - if 2=3 then [] else [1,2];
  - if 2=3 then nil else [1,2];
  - if 2=3 then (2) else {1=2};
  - if 2=3 then (1,2) else {1=1, 2=2};