



Syntax

Implementations are in .ml files, interfaces are in .mli files.
 Comments can be nested, between delimiters (*...*)
 Integers: 123, 1_000, 0x4533, 0o773, 0b1010101
 Chars: 'a', '\255', '\xFF', '\n' Floats: 0.1, -1.234e-34

Data Types

unit void, takes only one value: ()
 int integer of either 31 or 63 bits, like 42
 int32 32 bits Integer, like 42l
 int64 64 bits Integer, like 42L
 float double precision float, like 1.0
 bool boolean, takes two values: true or false
 char simple ASCII characters, like 'A'
 string strings, like "Hello" or foo|Hello|foo
 bytes mutable string of chars
 'a list lists, like head :: tail or [1;2;3]
 'a array arrays, like [[1;2;3]]
 t₁ * ... * t_n tuples, like (1, "foo", 'b')

Constructed Types

type record = new record type
 { field1 : bool; immutable field
 mutable field2 : int; } mutable field
 type enum = new variant type
 | Constant Constant constructor
 | Param of string Constructor with arg
 | Pair of string * int Constructor with args
 | Gadt : int -> enum GADT constructor
 | Inlined of { x : int } Inline record

Constructed Values

let r = { field1 = true; field2 = 3; }
 let r' = { r with field1 = false }
 r.field2 <- r.field2 + 1;
 let c = Constant
 let c = Param "foo"
 let c = Pair ("bar",3)
 let c = Gadt 0
 let c = Inlined { x = 3 }

References, Strings and Arrays

let x = ref 3 integer reference (mutable)
 x := 4 reference assignation
 print_int !x; reference access
 s.[0] string char access
 t.(0) array element access
 t.(0) <- x array element modification

Imports — Namespaces

open Unix global open
 let open Unix in *expr* local open
 Unix.*(expr)* local open

Functions

let f x = *expr* function with one arg
 let rec f x = *expr* recursive function
 apply: f x
 let f x y = *expr* with two args
 apply: f x y
 let f (x,y) = *expr* with a pair as arg
 apply: f (x,y)
 List.iter (fun x -> *expr*) l anonymous function
 let f= function None -> *act* function definition
 | Some x -> *act* [by cases]
 apply: f (Some x)
 let f ~str ~len = *expr* with labeled args
 apply: f ~str:s ~len:10
 apply (for ~str:str): f ~str ~len
 let f ?len ~str = *expr* with optional arg (option)
 let f ?(len=0) ~str = *expr* optional arg default
 apply (with omitted arg): f ~str:s
 apply (with commuting): f ~str:s ~len:12
 apply (len: int option): f ?len ~str:s
 apply (explicitly omitted): f ?len:None ~str:s
 let f (x : int) = *expr* arg has constrained type
 let f : 'a 'b. 'a*'b -> 'a function with constrained
 = fun (x,y) -> x polymorphic type

Modules

module M = struct .. end module definition
 module M: sig .. end= struct .. end module and signature
 module M = Unix module renaming
 include M include items from
 module type Sg = sig .. end signature definition
 module type Sg = module type of M signature of module
 let module M = struct .. end in .. local module
 let m = (module M : Sg)
 module M = (val m : Sg)
 module Make(S: Sg) = struct .. end functor
 module M = Make(M') functor application

Module type items: val, external, type, exception, module,
 open, include, class

Pattern-matching

match *expr* with
 | *pattern* -> *action*
 | *pattern* when *guard* -> *action* conditional case
 | _ -> *action* default case

Patterns:
 | Pair (x,y) -> variant pattern
 | { field = 3; _ } -> record pattern
 | head :: tail -> list pattern
 | [1;2;x] -> list pattern
 | (Some x) as y -> with extra binding
 | (1,x) | (x,0) -> or-pattern
 | exception *exn* -> try&match

Conditionals

Do NOT use on closures

Structural	Physical	
=	==	Polymorphic Equality
<>	!=	Polymorphic Inequality

 Polymorphic Generic Comparison Function: compare

	x < y	x = y	x > y
compare x y	negative	0	positive

 Other Polymorphic Comparisons: >, >=, <, <=

Loops

while cond do ... done;
 for var = min_value to max_value do ... done;
 for var = max_value downto min_value do ... done;

Exceptions

exception MyExn	new exception
exception MyExn of t * t'	same with arguments
exception MyFail = Failure	rename exception with args
raise MyExn	raise an exception
raise (MyExn (args))	raise with args
try <i>expr</i>	catch MyExn
with MyExn -> ...	if raised in <i>expr</i>

Objects and Classes

class virtual foo x =	virtual class with arg
let y = x+2 in	init before object creation
object (self: 'a)	object with self reference
val mutable variable = x	mutable instance variable
method get = variable	accessor
method set z =	
variable <- z+y	mutator
method virtual copy : 'a	virtual method
initializer	init after object creation
self#set (self#get+1)	
end	
class bar =	non-virtual class
let var = 42 in	class variable
fun z -> object	constructor argument
inherit foo z as super	inheritance and ancestor reference
method! set y =	method explicitly overridden
super#set (y+4)	access to ancestor
method copy = {< x = 5 >}	copy with change
end	
let obj = new bar 3	new object
obj#set 4; obj#get	method invocation
let obj = object .. end	immediate object

Polymorphic variants

type t = [`A `B of int]	closed variant
type u = [`A `C of float]	
type v = [t u]	union of variants
let f : [< t] -> int = function	argument must be
`A -> 0 `B n -> n	a subtype of t
let f : [> t] -> int = function	t is a subtype
`A -> 0 `B n -> n _ -> 1	of the argument