Unlike Java, F#'s primitive types ...

- Have signed and unsigned versions.
- Include a fixed precision point type.

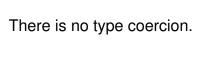
How can you use an integer as the base of an exponent?

You must use pown instead of **, or convert to a floating-point type.

What are the conversion functions for primitive types?

They have the same names as the types being converted to.

Why are conversion functions more widely used in F#?



For arbitrary precision integers F# features what?

Language support. Literals ending with I are

System.Numerics.BigIntegers.

What are the bitwise operators?

`&&&`, `|||, `^^^`, `<<<`, `>>>`

Index a string.

"abcd".[0]

How are multi-line strings written?

- One can end each line with a backslash while still in a string.
 Leading whitespace will be removed from the next line.
 With verbatim strings, but leading whitespace will not be
- removed.

What is the verbatim string syntax?

An @ before the string begins.

What shortcut is provided for converting a string literals to arrays of bytes?

The suffice B after the close quote of a string literal.

How is negation written?

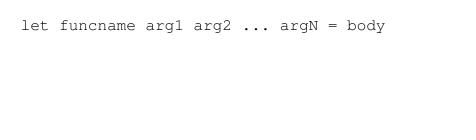
not for unary negation.

How is equality written?

Inequality?



What is the syntax of function definitions?



The result of a function is ...

The value of the last expression in a given path. There is no return keyword.

How are function types written?

As in Haskell:

type1 -> type2 -> ... -> typeN

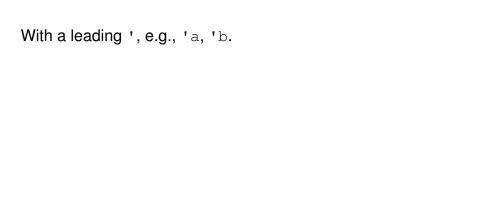
Unlike in Haskell, functions using operators like + will default to ...

... int parameters instead of type parameters.

How are type annotations written?

As usual, name: type.

How are type parameters written?



Unlike in Scala, shadowing is allowed where?

In the same block. E.g., two consecutive lines can let the same identifier.

What is the syntax of conditionals?

if cond1 then res1
elif cond2 then res2
...
else res

Unlike in Scala, each branch of a conditional must have what?

The same type. Upcasting will not be done.

How are tuples written?

How are their types written?

Comma separated values surrounded by round parens.

```
type1 * type2 * ... * typeN
```

Access the elements of a tuple.

- Use fst and snd.

- Unpack with let

let a, b, c = (1, 2, 3)

What is the list literal syntax?

Semi-colon separated values surrounded by square brackets.

What is the syntax of list comprehensions?

Basically arbitrary code within square brackets. Elements are selected using the yield keyword.

How are list comprehensions evaluated?

Eagerly, in memory.

Loop over a range.

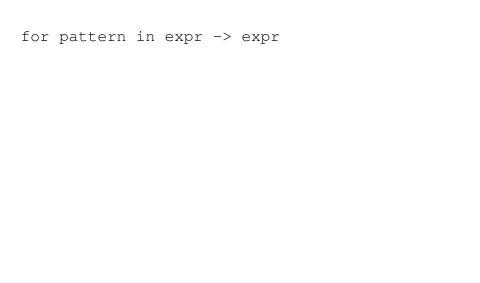
for var = start-expr to end-expr do
 //body

to is inclusive, as in Scala.

Loop over a collection.

for pattern in expr do //body

What shortcut for syntax is provided for list comprehensions?



In the F# API, what's the difference between fold and reduce?

reduce uses the first element of the list as the initial accumulator value, fold takes the initial accumulator value explicitly.

Run a block of code on each element of a list.

List.iter is like Scala's foreach.

What is used in place of null?

As in Scala, Option can have values Some ('a) or None.

Why is printfn more useful than using System. Console's print methods?

The arguments to the formatting string are type checked, contributing to type inference.

What are the printfn format specifiers?

```
%d, %i - integer
%s - string
```

%f - floating-point number

%c - character

%b - boolean

%O - object

%A - anything

If no module is specified, you are actually using what?

How can it be accessed?

you are using the anonymous module which can nonetheless be accessed using the filename with the first

letter capitalized.

For example, MyFile.someValue.

Create a module explicitly.

module MyModule

//whatever

Create a nested module.

Equal sign and indentation are mandatory:

```
module Outer
module Inner =
    //whatever
```

How are namespaces different from modules?

- they can contain declarations but not values.
- they cannot be nested

What are the ideal use-cases for modules and namespaces?

Namespaces: large object-oriented programs

Modules: rapid prototyping

How does an F# program execute?

Straight down the *last* code file.

2

Create an explicit entry point.

Add the [<EntryPoint>] attribute to a method.

It must be in the last function in the last file of the program.

It must take a string array and return an integer.