CSc 372, Fall 2006; Quiz 1
Time: 3:00; Value: 2 points

1. What is a fundamental difference between the if-then-else constructs in Java (or C) and ML?

2. True or false: The `val` declaration is used to create variables in ML.

3. True or false: Iteration is a characteristic of imperative programming.

4. Consider the Java expression `"a".equals("b")`. Write an equivalent expression in ML.

Please number your answers. Don't restate questions.

Use your CS login id to identify yourself.

CSc 372, Fall 2006; Quiz 2
Time: 3:00; Value: 2 points

1. What is the type of the following function?

```
fun f(a, b, c) = if a then b else c + 1.0
```

2. Write a function that has the following type:

```
'a * string -> int
```

(It need not do anything useful; only the type matters.)

Please number your answers. Don't restate questions.

Use your CS login id to identify yourself.

CSc 372, Fall 2006; Quiz 3; Time: 4:00; Value: 2+2 points

1. Write a function **`len(L)`** that returns the length of the list **`L`**. You may not call any functions except **`len`** itself. (For example, **`length`** is off limits!!)

```
- len [5,1,4];
val it = 3 : int
```

2. Write a function **`last(L)`** that returns the last element in the list **`L`**. Assume that **`L`** has at least one element.

```
- last [1,2,3];
val it = 3 : int

- last;
val it = fn : 'a list -> 'a
```

Use your CS login id to identify yourself.

CSc 372, Fall 2006; Quiz 4; Time: 4:00; Value: 3+3 points

1. `L` is a list of lists. Write a function `drev(L)` that reverses the order of elements in `L` and also reverses the order of values in the contained lists.

```
- drev [[1,2,3],[4],[5,6]];
val it = [[6,5],[4],[3,2,1]] : int list list
```

2. Write a function `nOnes(L)` that returns the number of one-character strings in `L`, a `string list`.

```
- nOnes ["just", "a", "test", "."];
val it = 2 : int
```

Reference: `fn(x) => x * 2` creates an anonymous function of type `int -> int` that doubles its argument.

Don't worry too much about precedence and parentheses.
Use your CS login id to identify yourself.

CSc 372, Fall 2006; Quiz 5; Time: 3:30; Value: .9+1+1+1+1 points

1. For the following, assume `s = "testing"`.
   (a) What is the value of `s[2,3]`?
   (b) What is the value of `s[20]`?
   (c) What is the value of `s` after `s[1..-2] = "x"`

2. Give an example of a Ruby array that wouldn't be a valid ML list.

3. What is the name of the program used to execute Ruby expressions interactively?

4. True or False: Ignoring the handling of types like `int` and `char`, Ruby does essentially the same sort of type-checking that Java does.

5. The `Array` class has a method called `"reverse!"`. What does it do?

Please put your CS login in the upper left hand corner of the page. Thanks!

CSc 372, Fall 2006; Quiz 6; Time: 3:00; Value: .9+3 points

1. For the following, assume `s = "testing"`.
   (a) What is the value of `s[2,3]`?
   (b) What is the value of `s[20]`?
   (c) What is the value of `s` after `s[1..-2] = "x"`

2. `a` is an array consisting of a mix of strings and arrays. Write a method `all_sizes(a)` that returns an array of the sizes of the elements of `a`, regardless of whether each element is a string or an array. Example:

```
>> all_sizes ["abcd",[0,0], "x", [[1,2]] ]
=> [4, 2, 1, 1]
```

Reminder: `x.is_a? Array` (or `String`) can be used to test the type of `x`.

3. Extra credit (1 point): What is "duck typing"?

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CSc 372, Fall 2006; Quiz 7; Time: 2:00; Value: 2 points

1. Write an iterator `f_L(s)` that yields the first character of `s` and then yields the last character of `s`.

2. Show an example of usage of `f_L` that prints those two characters on two separate lines, like this:

```
>> f_L("abc") { ... } # TODO: fill in the ...
a
c
```

Assume `s` has at least one character.

CSc 372, Fall 2006; Quiz 8; Time: 2:00; Value: 2 points

1. The following program is to read lines from standard input and print lines that contain both an `"x"` and a `"y"`, in either order. Fill in the blank to make it work.

```
while line = gets
  puts line if _____________________________________
end
```

Three examples of words that satisfy the criteria are **expertly**, **syntax**, and **boxy**.

Don't copy the code above, just specify the contents of the blank.

CSc 372, 10/24/06; Quiz 9; Time: 4:00; Value: 2+1+1+1 points

```
class Line
    def initialize len; @len = len; end
    def len; @len; end
end
```

1. Write the additional code required to make the following work:

```
>> L1 = Line.new(3)    => #<Line: @len=3>

>> L2 = Line.new(4)    => #<Line: @len=4>

>> L3 = L1 + L2        => #<Line: @len=7>

>> L3.len              => 7
```

2. How many methods must a class provide to mixin `Enumerable`?
3. What is Tk? (Ten words or less!)
4. According to `whm`, what is the most interesting thing about JRuby?

CSc 372, 10/31/06; Quiz 10; Time: 3:00; Value: 1+2+1 points

1. Is `x(y)` a fact, a query, or a structure?

2. Identify each of the following as atom, generator, number, string, or variable: (OK to abbreviate a/g/n/s/v and write only answers in order.)

```
 abc

'abc'

 Abc

 123

'123'
```

3. Represent the query `food(X)` with a four-port model.

CSc 372, 11/9/06; Quiz 11; Time: 4:00; Value: 2+2+2 points

1. Write a predicate `around(-Prev, +N, -Next)` that instantiates `Prev` to `N-1` and `Next` to `N+1`.

```
?- around(P, 7, N).
P = 6
N = 8
```

2. Write a predicate `same/3` that succeeds iff all its arguments are the same.

```
?- same(1,2,3).
No
?- same(abc,abc,abc).
Yes
```

3. What's wrong with the following problem?

Write a predicate `add(+X,+Y)` that returns the sum of `X` and `Y`.

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CSc 372, 11/16/06; Quiz 12; Time: 2:00; Value: 2 points

1. Write the well-known `member(?Elem, ?List)` predicate. Your implementation may use no predicates other than those you write yourself.

```
?- member(2,[1,2,3]).
Yes

?- member(X,[1,2,3]).
X = 1 ;
X = 2 ;
X = 3 ;
No
```

If your implementation is as concise as possible, you'll earn a point of extra credit!

If your `lectura` login is not in the upper left hand corner of your paper, you'll lose a point! (See placement guide, above left.)

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CSc 372, 11/28/06; Quiz 13; Time: 4:00; Value: (0.7 * 7) points

1. What is the fundamental data structure in Lisp?

2. Write the Lisp analog for this Ruby expression: `x = 1`

3. The `cond` function is the analog for what element of Java?

4. Typically, the predominate syntactic element in Lisp code is the _____.

5. Write a function `f(L)` that returns `N*3` where `N` is the first element of the list `L`. Don't do any error-checking.

6. What are the data objects that Emacs uses to hold text being edited?

7. What is the name of the function that returns the cursor position?

THIS QUIZ IS OPEN NOTES!

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CSc 372, 11/30/06; Quiz 14; Time: 4:00; Value: 6 points

1. At what university was Icon developed?

2. Who led the Icon project?

3. Write an expression that prints the length of the string `s`.

4. Write an Icon expression that fails.

5. Write an Icon expression that prints the numbers from 1 through 10, one per line.

6. How many functions comprise Icon's string scanning facility? (+/- 5)

7. Extra credit: What is the result sequence of `(1 to 5) > 3`?

This quiz is **CLOSED NOTES**!