

CMSC330 Spring 2010 Practice Problems 8

1. Operational semantics

Use operational semantics to determine the values of the following OCaml codes:

- a. 1
- b. + 3 7
- c. + 1 (+ 2 3)
- d. (fun x = 4) 5
- e. (fun x = + x 6) 7
- f. (fun x = (fun y = + y x)) 8 9

2. Programming languages

- a. Describe the difference between ad-hoc and parametric polymorphism.
- b. Describe 2 differences between HTML and XML.
- c. Describe the difference between query languages and programming languages.

3. Polymorphism

Consider the following Java classes:

```
class A { public void a() { ... } }  
class B extends A { public void b() { ... } }  
class C extends B { public void c() { ... } }
```

Explain why the following code is or is not legal

- a. `int count(Set<A> s) { ... } ... count(new Set<A>);`
- b. `int count(Set<A> s) { ... } ... count(new Set<B>);`
- c. `int count(Set s) { ... } ... count(new Set<A>);`
- d. `int count(Set<?> s) { ... } ... count(new Set<A>);`
- e. `int count(Set<? extends A> s) { ... } ... count(new Set<B>);`
- f. `int count(Set<? extends B> s) { ... } ... count(new Set<A>);`
- g. `int count(Set<? extends B> s) { for (A x : s) x.a(); }`
- h. `int count(Set<? extends B> s) { for (C x : s) x.c(); }`
- i. `int count(Set<? super B> s) { for (A x : s) x.a(); }`
- j. `int count(Set<? super B> s) { for (C x : s) x.c(); }`

4. Markup languages

- a. Creating your own XML tags, write an XML document that organizes the following information: 1-hour test on Spanish Monday in Jiménez worth 15%. 1-hour test on Computers Tuesday in CSIC worth 10%. 30-minute test on Computers Friday in AVW worth 5%.