CMSC 330, Fall 2017 Quiz 1

Name (as it appears on Gradescope) _____
Discussion Time (circle one) 10am 11am 12pm 1pm 2pm 3pm
Discussion TA (circle one) Joseph Greg Justin Michael BT Daniel David Derek
Cameron Eric Kesha Shriraj Pei-Jo Michael Bryan Kameron

Instructions

- Do not start this quiz until you are told to do so.
- You have 15 minutes for this quiz.
- This is a closed book quiz. No notes or other aids are allowed.
- For partial credit, show all your work and clearly indicate your answers.

1. *(2 points each)* What is the type of the following OCaml expressions?

   a. `[("hello", 7, true)]`

   b. `let foo x y = x :: y :: [1.0]`

   c. `let foo x y z = (x z) && (y z)`

2. *(2 points each)* Write OCaml expressions of the following types without using type annotations.

   a. `string * float list`

   b. `('a -> int) -> 'a -> int`

3. *(5 points)* Write an function `cap : 'a list -> 'a -> 'a list` which takes a list of values *lst* and a value *limit*, and returns a list of values with each value greater than *limit* replaced with *limit*. You may use *map*, defined below. (Hint: <, <=, >=, > have the type `'a -> 'a -> bool`.)

```
let rec map f xs =
    match xs with
    | [] -> []
    | x :: xs -> f x :: map f xs
```

```
cap [1; 4; 3; 2; 5] 3 = [1; 3; 3; 2; 3]
cap [1; 2; 3] 0 = [0; 0; 0]
cap [1.0; 2.0; 3.0] 6.0 = [1.0; 2.0; 3.0]
```

4. *(5 points)* Write a function range : `int -> int -> int list` which takes an int *start* and an int *end* and returns a list of consecutive integers in the range [*start*, *end*) (excluding *end*).

```
range 0 4 = [0; 1; 2; 3]
range (-2) 2 = [-2; -1; 0; 1]
range 4 4 = []
range 4 2 = []
```