

CMSC 330 Quiz #3

Name

UID

Discussion Section:	9am Vicky	10am Vicky	11am Richard	12pm Richard
	9am Varun	10am Varun	11am Tammy	12pm Tammy

Instructions

- Do not start this test 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 of your work and clearly indicate your answers.
- Write neatly. Credit cannot be given for illegible answers.
- This quiz is for 21 points.

1. (2 points each) Give the type that OCaml would infer for each of these functions. If the program cannot be type checked, then write ERROR.

a. `let f x = x+1;;`
`int->int`

b. `let f (x,y) = x+y;;`
`int*int->int`

c. `let f x = x+y;;`
ERROR

d. `let rec f x =`
 `match x with`
 `[] -> 0`
 `| (a,b) -> a+b`
 `| h::t -> h+(f t);;`
ERROR

e. `let f (x,y) = (y,x);;`
`'a'*b->'b'*a`

2. (3 points each) Indicate the value returned by the last line of code below. If the program fails in some way, write ERROR next to the program.

```
a. let rec f x =  
    match x with  
    [] -> []  
    | h::t -> (h*h)::(f t);;  
  
    f [1;2;1;4];;
```

Answer: [1;4;1;16]

```
b. let rec f x =  
    match x with  
    [] -> 0  
    | h1::h2::t -> h1+(f t)  
    | [y] -> y;;  
  
    f [2;3;4;5;6];;
```

Answer: 12

3. (5 points) Write a function that takes a list of pairs and then sums alternating elements. For example, if this function is called `f` and `x = [(1,2); (3,4); (5,6); (7,8)]` then,

$$(f\ x) = 1+4+5+8 = 18.$$

That is, we sum the first element of the first pair, with the second element of the second pair, with the first element of the third pair, and the second element of the fourth pair, etc. zigzagging through the input.

```
let rec sum l =  
    match l with  
    [] -> 0  
    | (a1,b1)::(a2,b2)::t -> a1+b2+(sum t)  
    | [(a,b)] -> a
```