

CSC301 Assignment #4

Baheem Ferrell

Write functions for the following specifications.

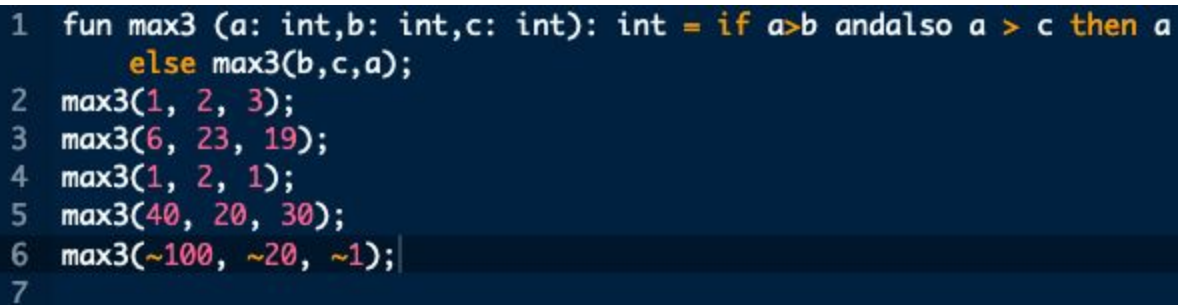
For each problem, paste in your SML function definition (text that can be copied and pasted to try out your code) and a screenshot of your program running with some example data. Submit a PDF of this document.

Handwritten programs are not accepted!

Problem

Write a function `max3` of type `int*int*int -> int` that returns the largest of three integers.

fun max3 (a: int,b: int,c: int): int = if a>b andalso a > c then a else max3(b,c,a);



```
1 fun max3 (a: int,b: int,c: int): int = if a>b andalso a > c then a
   else max3(b,c,a);
2 max3(1, 2, 3);
3 max3(6, 23, 19);
4 max3(1, 2, 1);
5 max3(40, 20, 30);
6 max3(~100, ~20, ~1);
7
```

```
- val max3 = fn : int * int * int -> int
val it = 3 : int
val it = 23 : int
val it = 2 : int
val it = 40 : int
val it = ~1 : int
-
```

Problem

Write a function `second` of type `'a list -> 'a` that returns the second element of a list. Your function need not behave well on lists with less than two elements.

fun second (a: 'a list): 'a = hd(tl(a));

```

1 fun second (a: 'a list): 'a = hd(tl(a));
2 second [1, 2];
3 second [1, 2, 3, 4, 5];
4 second ["one", "two", "three"];
5 second( second [[1, 2, 3], [4, 5, 6]]);

```

```

- val second = fn : 'a list -> 'a
val it = 2 : int
val it = 2 : int
val it = "two" : string
val it = 5 : int
-

```

Problem

Write a function permute of type 'a list -> 'a list whose output list is the same as the input list, but with the first two elements of the list swapping.

For example: permute ([1,2,3,4]) should return [2,1,3,4] or permute(["a","b","c"]) should return ["b","a","c"]

Your function should work with lists of any length.

```
fun permute (a: 'a list): 'a list = hd(tl(a))::hd(a)::tl(tl(a));
```

```

1 fun permute (a: 'a list): 'a list = hd(tl(a))::hd(a)::tl(tl(a));
2 permute [1, 2];
3 permute [1, 2, 3, 4, 5];
4 permute ["one", "two", "three"];
5 permute (permute [1, 2, 3]);
6 permute [1.23, 2.34];
7 permute [#"a", #"b"];
8 permute [(1, 2), (3, 4)];

```

```

- val permute = fn : 'a list -> 'a list
val it = [2,1] : int list
val it = [2,1,3,4,5] : int list
val it = ["two","one","three"] : string list
val it = [1,2,3] : int list
val it = [2.34,1.23] : real list
val it = [#"b",#"a"] : char list
val it = [(3,4),(1,2)] : (int * int) list
-

```