CS2203 / CSX3004 Programming Languages

Week 4 Worksheet 1

Write the following functions in ML.

1. Function **isodd** of type **int -> bool** that returns true if the given parameter is an odd number.

2. Function **cube** of type **int -> int** that returns the cube of its parameter.

3. Function **cuber** of type **real -> real** that returns the cube of its parameter.

4. Function **fourth** of type **'a list -> 'a** that returns the fourth element of the given list. Your function does not need to behave well on a list with less than four elements.

5. Function **min3** of type **int * int * int -> int** that returns the smallest value of three integers.

6. Function **remove2** of type **'a * 'b * 'c -> 'a * 'c** that converts a tuple of three elements into two by removing the second element from the given parameter.

7. Function **thirdch** of type **string -> char** that returns the third character of the given string. Your function does not need to behave well on strings whose lengths are less than 3.

8. Function **rotate** of type **'a list * int -> 'a list** that takes a list and an integer **n** and returns the same list with the first element rotated to the end of the list **n** times.
   For example, `rotate([1,2,3,4,5], 3)` should return the list `[4,5,1,2,3]`.

9. Function **max** of type **int list -> int** that returns the largest element in the list. Your function does not need to behave well on empty list.
   Hint: Write a helper function `maxhelper` that takes the largest element seen so far as a second element.

10. Write a function **select** of type **'a list * ('a -> bool) -> 'a list** that takes a list and a function f as parameters. Your function should apply *f* to each element of the list and return a new list containing only those elements of the original list for which *f* returns true.
    For example, `select([1,2,3,4,5,6,7,8,9,10], isodd)` should return the list `[1,3,5,7,9]`.