Homework 1

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1 Q1

This is computed using Mozart. Comb2 function is faster than Comb that's given in assignment because it only calculate factorial two times. Comb3 is even faster than Comb2 because it shorten the factorial calculation.

```
declare
fun {Fact N}
   if N==0 then 1 else N*{Fact N-1} end
end

fun {Comb N R}
   {Fact N} div ({Fact R}*{Fact N-R})
end

%Below this are my codes

fun {Fact2 A B} %Calculate the product of all integers from A down to B
   (if A==B then 1
   else A*{Fact2 A-1 B} end)
end

fun {Comb2 N R} %modified comb function.
   {Fact2 N N-R} div {Fact R}
end

fun {Comb3 N R} %The function that is even more efficient
   if R > N-R then ({Fact2 N R} div {Fact N-R}) end
```

```
   {Fact2 N N-R} div {Fact R}
end

{Browse {Comb3 10 7}}
```

2 Q2 ruby

The following are computed in Ruby. The game is in a while loop so it restarts after fininshed

```
while true
  a = rand(1..99)

  print "Guess a value between 1 and 99: "
  b = gets.to_i

  while a != b
    if a < b then print "It's too big! Guess again: "
    elsif a > b then print "It's too small! Guess again: "
    end
    b = gets.to_i
  end
  print "It's correct!\n"

end
```

3 Q2 Fsharp

The following code is similiar to last section except it is in fsharp.

```
open System

let guessgame() = //Define the game function
    let rnd = Random()
    let a = rnd.Next(100) // generate the number
```

```
    printf "Please enter a number between 1 and 99: "
    let mutable s = ""
    s <- Console.ReadLine()
    let mutable b = s |> int // Get the user input numbner
    while not(a.Equals(b)) do // While not correct, let the user input again
        if a < b then
            printf "It's too big! Guess another one: "
            s <- Console.ReadLine()
            b <- s |> int
        elif a > b then
            printf "It's too small! Guess another one: "
            s <- Console.ReadLine()
            b <- s |> int
    printf "You are correct!\n" // Show winning

while true do //loop the function
    guessgame()
```