

### Assignment 5

This year again, I give you the choice of the questions, you only need to solve **ONE OF THEM** .

## Reenforcement Learning

Teach the computer to play "who say's 20 first". I give you the basic c-code. Solve it with either value iteration, dynamic programming or q-learning.

In the game, we have two players (one will be the computer). Starting at 0, each player moves alternating by adding either 1 or 2 to a running sum. The one who says 20 first wins.

The [game.c](#), it has

```
int computer(void)
```

coded, this needs to be replaced with one of the AI methods. You can even train it by letting it playing against the coded solution if you like to do it model less AI.

## Optimal Control

Implement the lander with observer and optimal controller. The observer determines the hight with an unknown gravity, the controller ensures the speed  $x'$  is zero as we reach ground at  $x=0$  starting at some initial hight. (note, the controller can not accelerate the lander, only break it, else you would have to turn it upside down ...)

I give you a [zip file](#) that has a Kalman and a DARE and a README file.

And in your main code (you do not modify the Kalman and the DARE) and a plot of a successful landing.