Assignment 17, due March 2

1. Please read the §4.2 (page 120) from the paper "Optimal search and one-way trading online algorithms" by R.El-Yaniv, A.Fiat, R.M.Karp, and G.Turpin (electronic copy available on the class website, page on resources) which gives details about the lenient adversary.

2. In the next class we'll study online portfolio selection. Please read §14.2 from the handout.

3. Both THREAT and the ADAPT-THREAT (the modified algorithm for a lenient adversary) have the same competitive ratio, although the latter is always as good as the former and sometimes better. Develop an alternative measure to evaluate online algorithms that ranks ADAPT-THREAT better than THREAT.

4. What characteristics of one-way trading problem, as opposed to, say, list accessing, make it easier to develop an online algorithm with optimal competitive ratio such as THREAT?

5. (Bonus question) Extend THREAT to solve "non-trivial" extensions of the one-way trading problem. E.g., suppose that, in order to manage the volume of trades, each trader is allowed at most a trades in the n trading days, where $a \leq n$. Extend the formulation of THREAT to express $c^*_{n,a}(m, M)$ the optimal competitive ratio as an expression that needs to be optimized. Find this optimal value for some, possibly restricted, situations. [This is an open problem with no submission due date. A "non-trivial" solution will be worth thrice a single assignment or more.]