1125-00-3178 **Seth Harris*** (`sharris2@drew.edu`), Drew University. *On-line algorithms and reverse mathematics.*

Consider a two-player game (played by Alice and Bob) in which Alice asks a sequence $\langle a_0, \ldots, a_k \rangle$ and Bob responds with a sequence $\langle b_0, \ldots, b_k \rangle$ with no knowledge of Alice's future requests. A problem P is solvable by an *on-line algorithm* if Bob has a winning strategy in this game, where Bob wins the game if $(\overline{a}, \overline{b})$ constitutes a solution to P.

Given a problem P, the corresponding *sequential problem* SeqP asserts the existence of an infinite sequence of solutions to P. For example, if P states "every finite graph without odd cycles is bipartite," then SeqP is the statement: "for every sequence of finite graphs without odd cycles, there exists a sequence of bipartitions."

We will show that the reverse-mathematical strength of SeqP is directly related to the on-line solvability of the non-sequential problem P, and we will exactly characterize which sequential problems are solvable in $\mathrm{RCA}_0$, $\mathrm{WKL}_0$, or $\mathrm{ACA}_0$. This is joint work with Franois Dorais, and generalizes James Schmerl's results specically for on-line graph colorings [2].

[1] F. G. Dorais and S. Harris, *Evasion, prediction, and on-line algorithms*, in preparation.

[2] J. Schmerl, *Reverse mathematics and graph coloring: eliminating diagonalization*, **Reverse Mathematics 2001, vol. 21 of Lecture Notes in Logic** (Stephen G. Simpson, editor), A K Peters, Ltd., Wellesley, MA, 2005, pp. 331–348.

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