1077-91-2023 **Tselil Schramm*** (tschramm@hmc.edu), 340 E. Foothill Blvd, Claremont, CA 91711, and **Emily Carlson** (ec9467@bard.edu), 39 Ridgeview Ave, West Orange, NJ 07052. *Sequences for Solving Puzzles and Touring Graphs.*

We examine Generalized Towers of Hanoi, Generalized Spin-Out, and the Combination Puzzle, and continue to describe the puzzles and their properties. We introduce Finite State Transducers (FSTs) that compute the shortest sequence of winning moves for each of these puzzles for all dimensions, and show that the solution sequence for Spin-Out is not finite-state computable when going from configuration $11\ldots1$ to configuration $00\ldots0$. We also examine the graphs of these puzzles, the class of graphs known as iterated complete graphs. We show that Hamiltonian paths and circuits exist but are not unique for iterated complete graphs of dimension greater than 3. We then introduce FSTs which produce Hamiltonian paths on K_d^n for every $d \in \mathbb{N}$, and prove the transducers' minimality for d odd – these FSTs define a d-ary Gray code. Finally, we create FSTs that produce a Hamiltonian circuit on K_d^n for all d. (Received September 21, 2011)