The key idea here is to convert each of these infinite 2-dimensional tapes into 1-dimensional tapes. Since the given Turing machine computes in time , that means each tape’s pointer doesn’t move up more than steps, doesn’t move right more than steps, doesn’t move down more than steps, and doesn’t move left more than steps, for a resulting moving-around, square-shaped space upper-bounded by around the starting point. In our new Turing machine, then, we start with the register pointing to the ’th cells in each tape. Whenever the original Turing machine moves up, our transition function makes it move left ; whenever it moves down, we make it move right ; whenever it moves left, we move left just the same; and whenever it moves right, we move right just the same. The original Turing machine moves up or down at most times, and each of those our Turing machine does in time, making our Turing machine compute in time.