1. Present a random access machine (RAM) that reads a binary number from the input tape and leaves its value in register $R_1$. (E.g., with input 1011 we want to get the value $8 + 2 + 1 = 11$ in register $R_1$.) Analyze the time and space complexity (a) according to the unit-cost model exactly and (b) according to the logarithmic-cost model using asymptotic $\Theta()$ notation.

2. Present a simple random access machine that receives a non-negative integer $n$ in register $R_1$ and computes the value $2^n$ to register $R_2$. (A brute force algorithm is sufficient for this assignment.) Analyze the time and space complexity according to both the unit-cost and the logarithmic-cost model, using asymptotic $O()$ or $\Theta()$ notation.

3. Present a Turing machine that computes the reversal of a binary word given as input. (C.f. the corresponding RAM discussed at lecture.) Analyze the time and space complexity of the machine exactly.

4. Sketch a nondeterministic Turing machine that recognizes $n$-bit long binary palindromes using time about $n$ and space about $\frac{3}{2}n$, only.

5. Present a deterministic two-tape Turing machine which receives two binary numbers of length $n \geq 1$, separated by a '+' sign, and computes their sum on the result tape. Analyze the time complexity of the machine.