Abstract We present an approach to reducing the average number of signal transitions (T_{av}) in the design of sign-detection and comparison of magnitudes. Our approach reduces T_{av} from $21n/8$ (n - operand precision in bits) to 4.5 in the case of iterative implementation, and from about n to roughly $k + n/2^{k-1}$ in the tree network implemented with k-bit modules. We also discuss comparison of small numbers. The approach is applicable to other arithmetic problems.