Arithmetic Coding (basic idea)

- Easier notation: represent characters by numbers $1 \leq c_t \leq |\Sigma|$. (English: $|\Sigma| = 26$)
- message-prefix $c_1, c_2, \ldots, c_{t-1}$ represented by line segment $[l_{t-1}, u_{t-1})$
- Initial segment $[l_0, u_0) = [0, 1)$
- After observing $c_1, c_2, \ldots, c_{t-1}$, predictor outputs $p(c_t = 1 \,|c_1, c_2, \ldots, c_{t-1}), \ldots, p(c_t = |\Sigma| \;\; |c_1, c_2, \ldots, c_{t-1})$,
- Distribution is used to partition $[l_{t-1}, u_{t-1})$ into $|\Sigma|$ sub-segments.
- next character c_t determines $[l_t, u_t)$
- Code = discriminating binary expansion of a point in $[l_t, u_t)$.