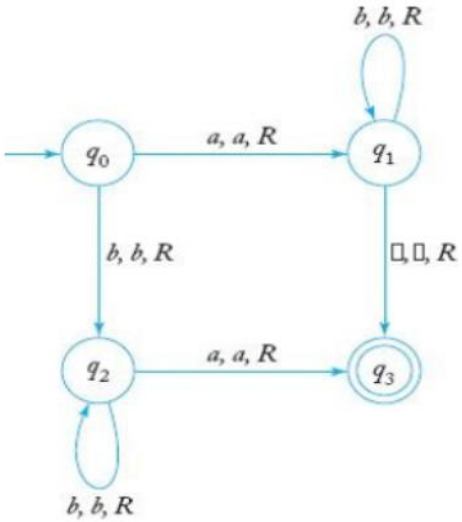
Problem Sheet for Turing machine. To be worked on 26/4/2021

Problem no. 1

What language is accepted by the Turing machine whose transition graph is in the figure below?



Problem no. 2

a) Draw block diagrams for Turing machines to compute the functions given below.
b) Also draw the transition function for each function appropriately invoking the TM for subfunction as per the block diagram drawn.
c) Draw a sequence of instantaneous description for each problem satisfying the conditions specified by the problem.

(a) $f(x) = 3x$.

(b) $f(x, y) = x - y, \quad x > y,$
$= 0, \quad x \leq y.$

(c) $f(x, y) = 2x + 3y$.

(d) $f(x) = \frac{x}{2}, \quad$ if x is even,
$= \frac{x+1}{2}, \quad$ if x is odd.

(e) $f(x) = x \bmod 5$.

(f) $f(x) = \lfloor \frac{x}{2} \rfloor$, where $\lfloor \frac{x}{2} \rfloor$ denotes the largest integer less than or equal to $\frac{x}{2}$.

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