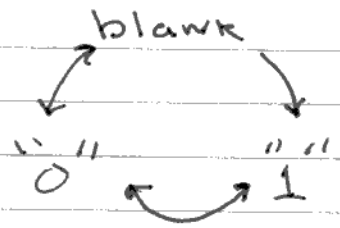
Elements of Turing Machine

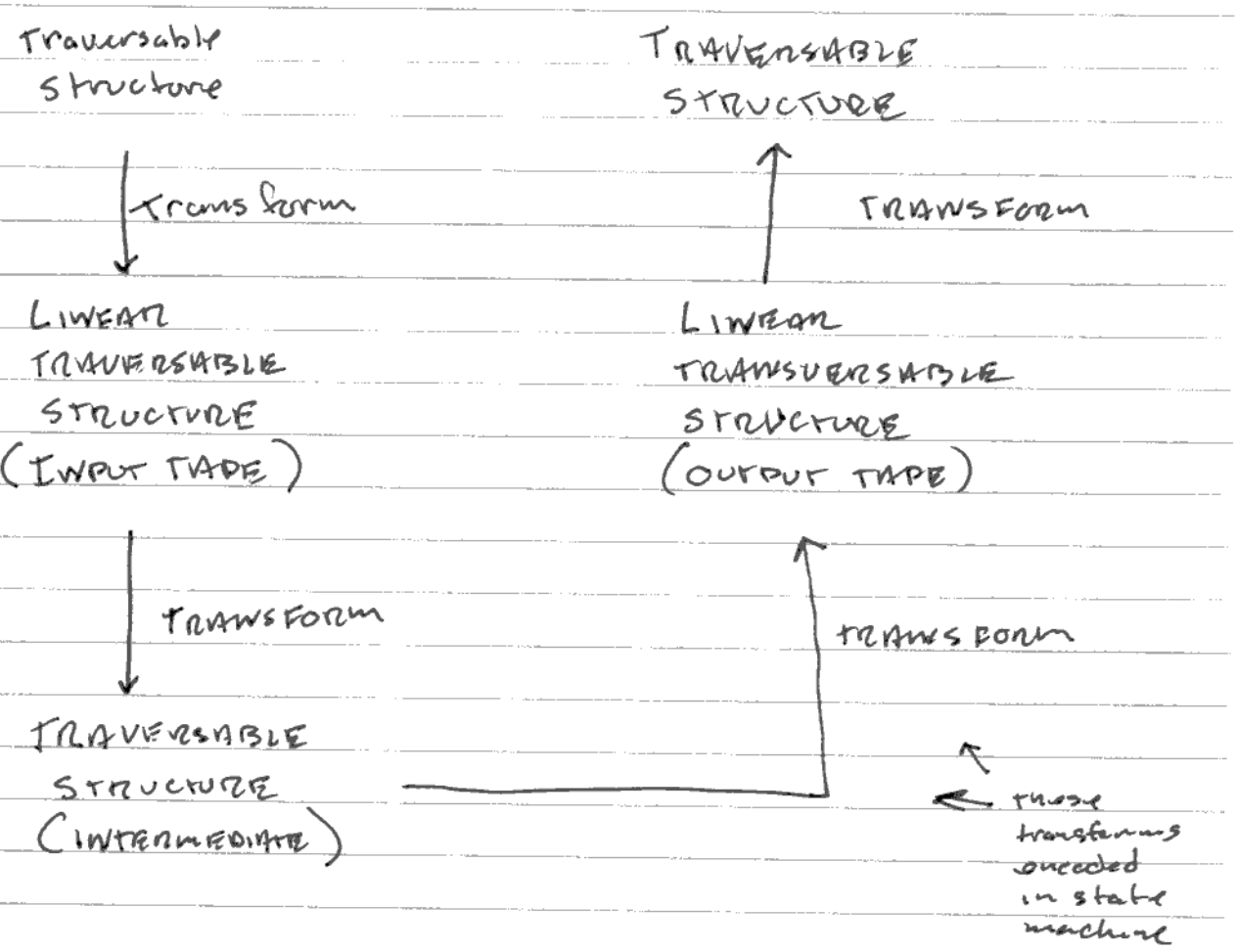
Traversable Structures

1. Input Tape
   - Linear, List structure w/ L, R, Noop ops
2. Output Tape
   - Linear, List structure w/ L, R, Noop ops
3. Intermediate Storage Tape
4. Finite State Machine
   - Directed Graph
5. Symbol on tape



ELEMENTS OF TURING MACHINE

TURING MACHINE AS A TRANSFORM

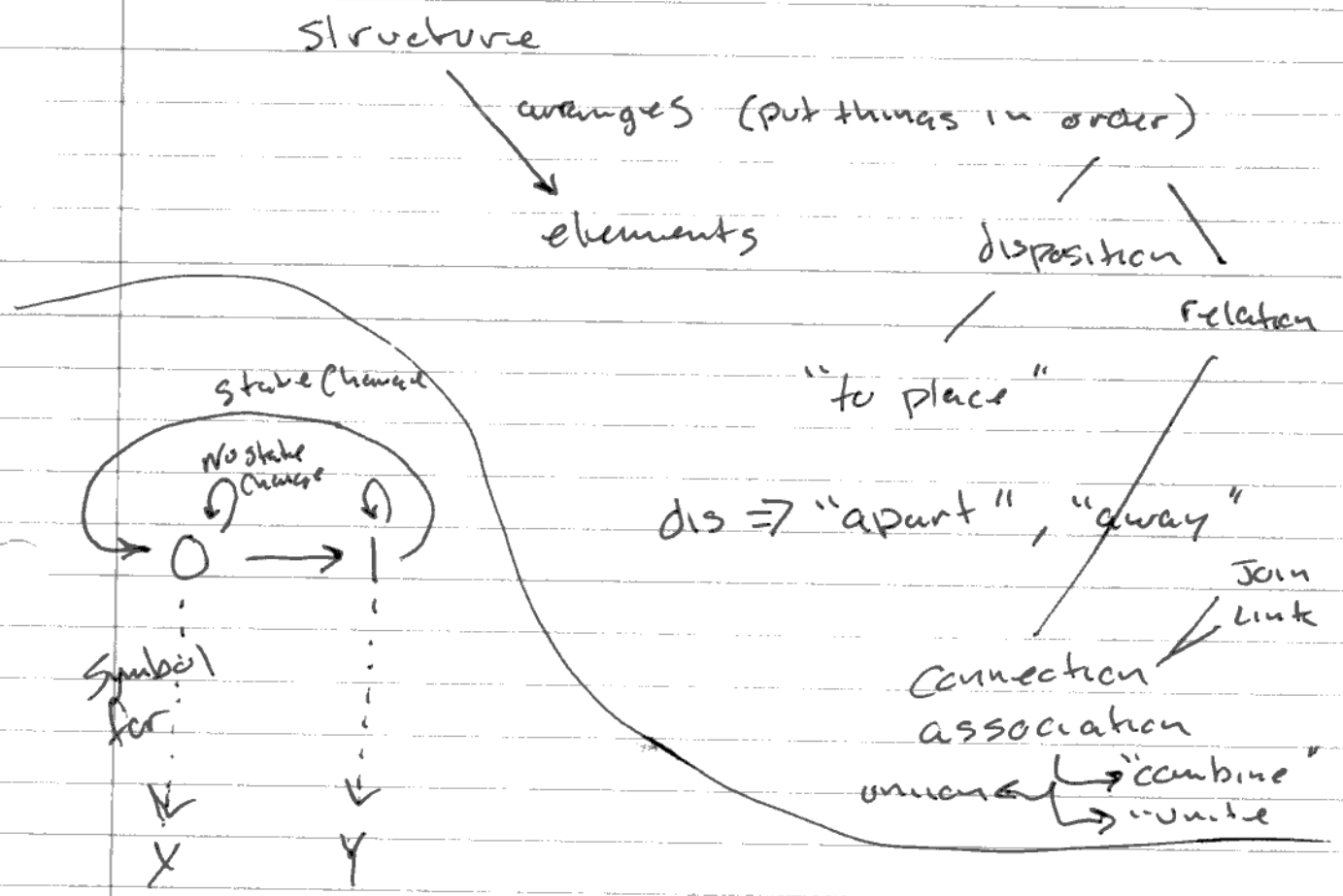


Implications

- A transform can be written to convert between any traversable structure and a simple linear traversable structure

Elements of Turing Machines

STRUCTURE → latin struere = "to build"

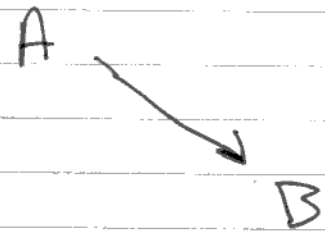


0 – 1

- Fundamental Discontinuity
- Circular data structure of minimum size
- ~~Unique in only 1 edge out of each state~~
- entirely traversable in one state transition
- transitions in system are
  - No change
  - Change

Elements of turing machines

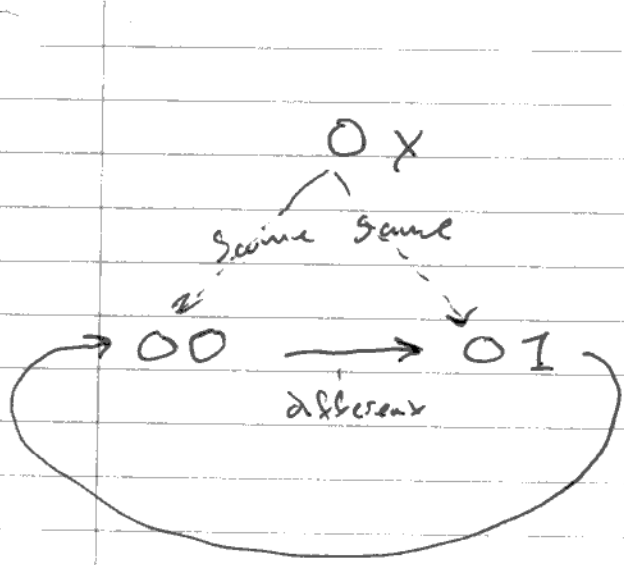
Structure cont

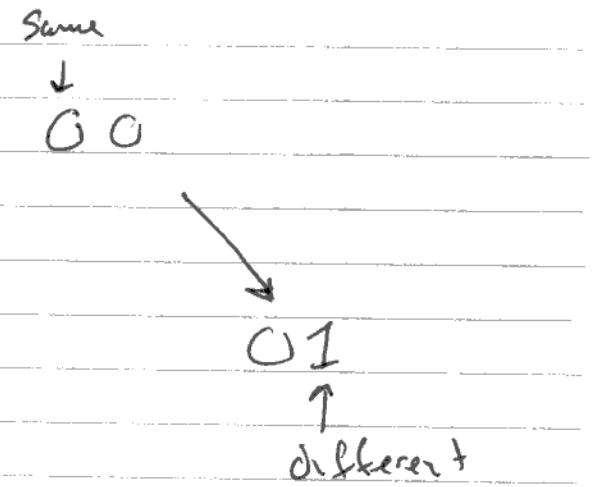


A, B are "apart"
"different"

A, B are "JOINED"
"Combined"
"union"
"linked"

A, B are partially the same
A, B are partially different





Elements of turing machines

Symbol

element

representing

element

Symbol

"before" "throw"

"sign"

represent

again present

present again

Elements of turing machine

- Traversable structures
  - input
  - internal state
  - output

- Transforms
  - World ↔ linear, input, output
  - linear ↔ basis structure; input, output
  - Symbol spaces (& nodes)

Elements of turing machines

Set of steps. each step:

- transform Symbol movement in structures

~~0, +1, +1~~

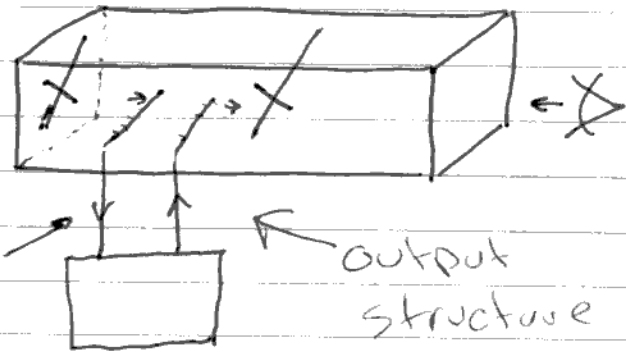
0, -1, +1

- Translate location in structure
  based on trigger of
  - no trigger
  - input or output symbol

- Current state is program counter
  State table is program
  local variables stored on tape
  local variables like intermediate transform

Turing machine cont.

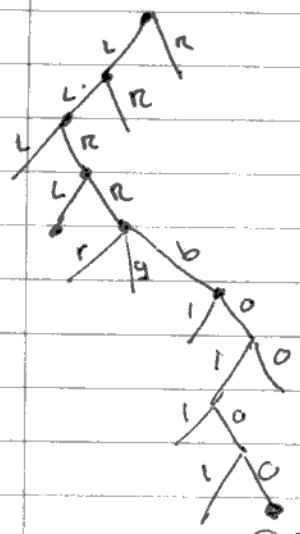
Real world example — symbols + traversable
- representation of reality w/ 0, 1 + structure
- concept of structure translation



@ 2cm
red 0100
green 0100
blue 0100

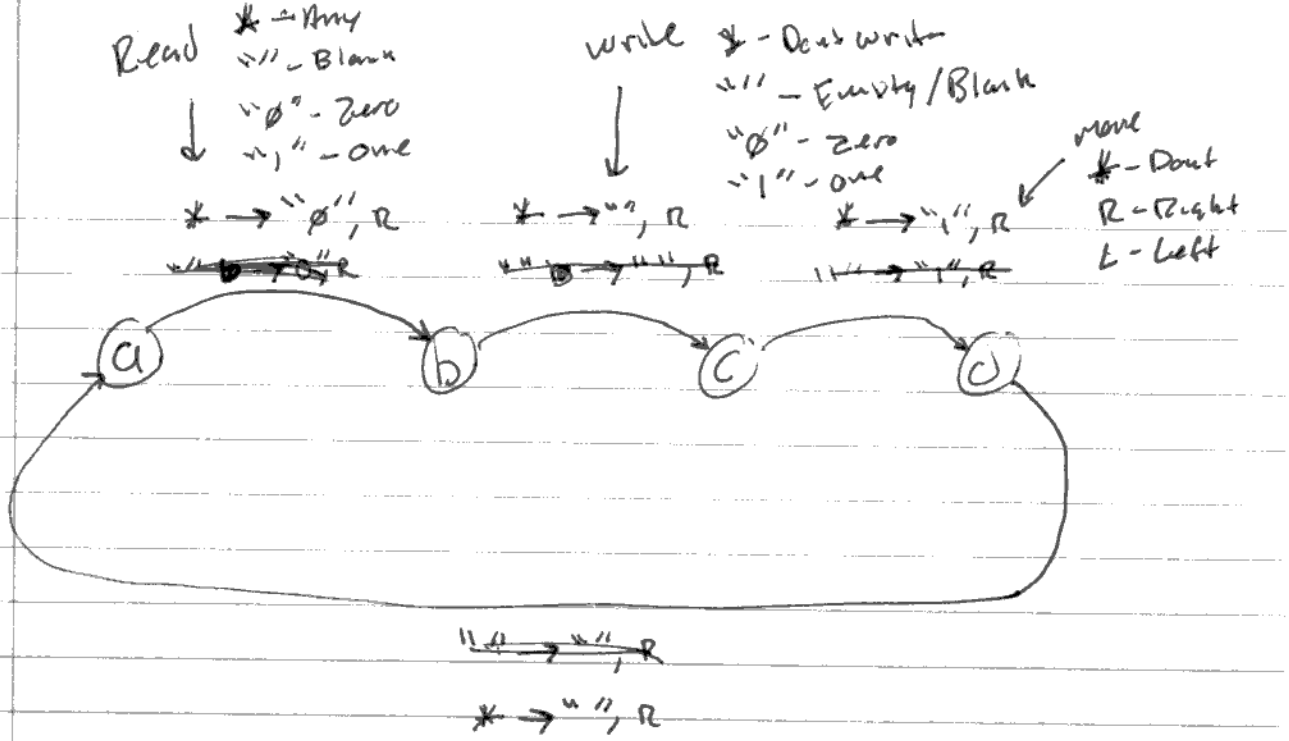
@ 2.1cm

@ 2.2 cm



transform → output structure

@ 2cm
blue = 0100



Turing machine as state diagram
(finite state machine)