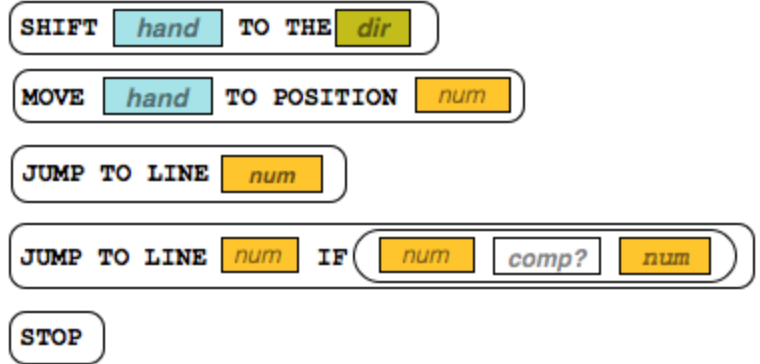# 8 Card Programming

Here are the beginnings of a more formalized low-level language you can use to create 8 Card Programs

The 5 commands you can use are shown to ‰the right. **See the _Reference Guide_ on the next page for descriptions of what these commands do.**

Some of these commands might seem unusual, but we can write programs with just these commands to control the hands to touch or pick up the cards, look at their values, and move left or right down the row of cards.

SHIFT `hand` TO THE `dir`

MOVE `hand` TO POSITION `num`

JUMP TO LINE `num`

JUMP TO LINE `num` IF (`num` `comp?` `num`)

STOP

Standard Card Setup
You should assume this standard initial setup. Here is a diagram for an 8-card setup::
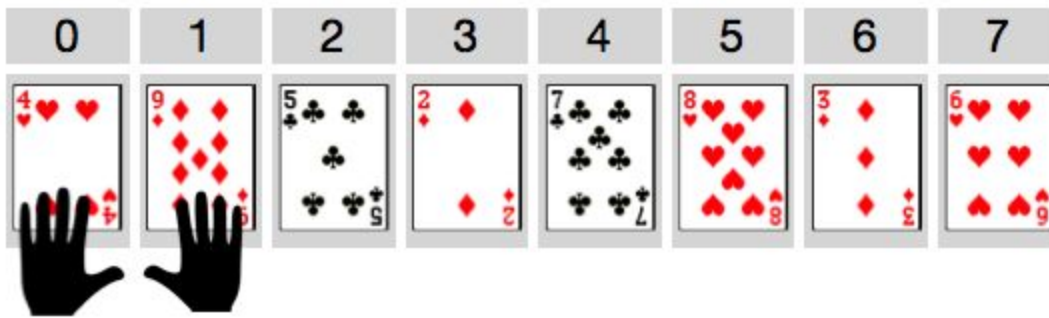
- There will be some number of cards with random values, lined up in a row, face up.
- Positions are numbered starting at 0 and increasing for however many cards there are.
- The left and right hands start at positions 0 and 1 respectively.

Try out some example programs

Get to know this new language. For each of the examples on the next page you should:
- Lay out a row of **8 cards** in front of you to test out the program.
- Read the instructions in sequence starting at line 1, and act out each command.
- Use the _**code reference**_ to answer your questions and verify you're interpreting the code correctly.
- Give a brief description of what the program does, or its ending state.

NOTES:
- Some of the programs are very simple
- Some of the programs might not ever stop
- The point is simply to practice using the language and executing commands as a "Human Machine"

Example Program	What does it do?
1 SHIFT `RH` TO THE `R` **2** SHIFT `RH` TO THE `R` **3** SHIFT `RH` TO THE `R` **4** SHIFT `RH` TO THE `R` **5** SHIFT `RH` TO THE `R` **6** SHIFT `RH` TO THE `R` **7** STOP	
1 SHIFT `RH` TO THE `R` **2** JUMP TO LINE `1` **3** STOP	*Note: this one has a problem, can you find it?*
1 SHIFT `RH` TO THE `R` **2** JUMP TO LINE `1` IF (`RHPos` `ne` `7`) **3** STOP	
1 MOVE `RH` TO POSITION `7` **2** SHIFT `LH` TO THE `R` **3** SHIFT `RH` TO THE `L` **4** JUMP TO LINE `2` IF (`RHPos` `gt` `LHPos`) **5** STOP	
1 JUMP TO LINE `5` IF (`LHCard` `eq` `9`) **2** SHIFT `LH` TO THE `R` **3** MOVE `RH` TO POSITION `LHPos` **4** JUMP TO LINE `1` **5** STOP	*Note: there is a potential problem with this one too. But only in certain circumstances. Can you find it?*

Reference Guide

Commands

Description	Examples
`SHIFT` [*hand*] `TO THE` [*dir*] Shift the given hand one position to the right or left along the row of cards.	`SHIFT` [LH] `TO THE` [R]
`MOVE` [*hand*] `TO POSITION` [*num*] Move a given hand to a specific position number in the row of cards.	`MOVE` [RH] `TO POSITION` [4] `MOVE` [LH] `TO POSITION` [RHPos]
`JUMP TO LINE` [*num*] Jump to a specific line number in the program and continue execution from that point.	`JUMP TO LINE` [1]
`JUMP TO LINE` [*num*] `IF` ([*num*] [*comp?*] [*num*]) Jump to line but ONLY IF the comparison of two numbers is *true*. If the comparison is *false* then just proceed onto the next line of code. ● For numbers, you can use **integers** or any of the hand values `RHCard, LHCard, RHPos, LHPos` ● For comparisons you can use `eq, ne, lt, gt,` (equal, not equal, less than, greater than)	`JUMP TO LINE` [4] `IF` ([LHCard] [eq] [7]) `JUMP TO LINE` [2] `IF` ([LHCard] [lt] [RHCard]) `JUMP TO LINE` [7] `IF` ([RHPos] [gt] [9])
`STOP` End of program. Stop doing anything, stop executing lines of code.	*This should be the last line of code in the program, or on a line that is jumped to when you want the program to stop.*

Hands, Values and Direction

There are some short-hand abbreviations for referring to the human machine, the cards, positions, and directions of movement.

Command	Abbreviation
SHIFT which hand **TO** direction	**S??**
MOVE which hand **TO** position	**M??**
JUMPTOLINE which line	**J?**
JUMPTOLINE which line **IF** # = #	**I????**
SWAP	**W**
STOP	**X**
Left / LH / LH Position	**l**
RIght / RH / RH Position	**r**
Left Hand Value	**L**
Right Hand Value	**R**
=	**e**
≠	**n**
>	**g**
<	**l**
≥	**G**
≤	**L**

Example:

Line	Command	Abbreviation
1	MOVE RH TO POSITION 7	1. Mr7
2	SHIFT LH TO THE R	2. Slr
3	SHIFT RH TO THE L	3. Srl
4	JUMP TO LINE 2 IF (RHPos gt LHPos)	4. I2rgl
5	STOP	5. X