Introduction to Computing: Program 4
(Save Simba - Part II)

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Objective

This is Part II of the *Save Simba* program you worked on in Program 3. In this part, you will make your program interactive. The player moves Simba through the Jungle. Simba starts with a Life Count of one, when he meets a friend his Life Count increases by one, when he meets a Hyena his Life Count decreases by one. When his Life Count goes to Zero or he reaches Home the journey ends. You must prevent Simba from falling off the Jungle Grid (there is a check for that move). The user's intended movement is taken as an input and the Jungle Grid is appropriately updated.

Details

We pick up where Part I left off. We now have a jungle that is loaded from a linked list giving us the coordinates of where Simba is and the destination (Home) he needs to reach. You will take input from the user, which is a keystroke (i,j,k or l) which conveys the intended direction to move Simba. You will verify if the user entered a valid keystroke, check if the move can be made and apply it or report otherwise. The process is repeated with each move, causing Simba's position to be updated in the Jungle Grid and displayed on the console. The program ends when Simba reaches Home or he is killed by a Hyena - which is a check you are asked to perform. The user can also quit the program by entering 'q' when prompted to enter a move.

The main program that is the engine of your game is provided to you along with the declaration of the `GRID` and several variables from Program3 . There is a new variable `LIFE_COUNT` which is initialized to #1. You will need the subroutines you wrote for Program 3 and complete four new subroutines. No changes are necessary to the subroutines you wrote in Program 3 if you did them right, simply copy the body of those subroutines from Program3.asm into your Program4.asm.

Your Task / Subroutines

Implement the following **four** subroutines. Three of these subroutines are called by my code, the other (`CAN_MOVE`) is a routine that is called from one of your subroutines. This routine will be independently tested just like `GRID_ADDRESS` from Part I.

- `IS_INPUT_VALID`: This subroutine validates the player move to make sure it is one of the movement characters. All it does is check if a valid character is entered.
  - Input: `R0` - a move represented by 'i', 'j', 'k', or 'l'
  - Output: `R2` - 0 = valid; -1 = invalid
  - Notes: The check is case-sensitive
- `CAN_MOVE`: This subroutine checks if a move can be made and returns the new position where Simba would go to if the move is made. To be able to make a move is to ensure that movement does not take Simba off the grid; this can happen in any direction.

In coding this routine you will need to translate a move to coordinates (row and column). Your APPLY_MOVE subroutine calls this subroutine to check whether a move can be made before applying it to the GRID.

- Inputs: R0 - a move represented by 'i', 'j', 'k', or 'l'
- Outputs: R1, R2 - the new row and new col, respectively, if the move is possible; if the move cannot be made (outside the GRID), R1 = -1 and R2 is untouched.

Notes: This subroutine does not check if the input (R0) is valid. You will implement this functionality in IS_INPUT_VALID. Also, this routine does not make any updates to the GRID or Simba's position, as that is the job of the APPLY_MOVE function.

- APPLY_MOVE: This subroutine makes the move if it can be completed. It checks to see if the movement is possible by calling CAN_MOVE which returns the coordinates of where the move takes Simba (or -1 if movement is not possible as detailed above).
  If the move is possible then this routine moves Simba's symbol (*) to the new coordinates and clears any walls (|'s and -'s) as necessary for the movement to take place.
  In addition,
  a. If the movement is off the grid - Output "Cannot Move" to Console
  b. If the move is to a Friend's location then you increment the LIFE_COUNT variable;
  c. If the move is to a Hyena's location then you decrement the LIFE_COUNT variable; IF this decrement causes LIFE_COUNT to become Zero then Simba's Symbol changes to X (dead)

  Input:
  R0 has move (i or j or k or l)
  Output: None; However must update the GRID and change CURRENT_ROW and CURRENT_COL if move can be successfully applied and appropriate messages are output to the console
  Notes: Calls CAN_MOVE and GRID_ADDRESS

- SIMBA_STATUS: Checks to see if the Simba has reached Home; Dead or still Alive using CURRENT_ROW, CURRENT_COL, HOME_ROW, HOME_COL, and LIFE_COUNT.
  Input: None
  Output: R2 is ZERO if Simba is Home; Also Output "Simba is Home"
  R2 is +1 if Simba is Alive but not home yet
  R2 is -1 if Simba is Dead (i.e., LIFE_COUNT =0); Also Output"Simba is Dead"

Testrun

Here is the console output for a sample run where the Jungle loaded was the same as shown in Program3. Only the first four and the last three Grid views are shown below. A complete sample run for the input sequence: `aJjjkkkllllliiiillkkkkkkliii` is given in this file: SampleRunConsoleHome.txt and shown below where Simba reaches Home:

```
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | | | | | | | | |
  +-+-+-+-+-+-+-+-+
1 | | | | | | | | |
  +-+-+-+-+-+-+-+-+
2 | | | | | | | | |
```

```
  +-+-+-+-+-+-+-+-+
3 | | | | | | | | |
  +-+-+-+-+-+-+-+-+
4 | | | | | | | | |
  +-+-+-+-+-+-+-+-+
5 | | | | | | | | |
  +-+-+-+-+-+-+-+-+
6 | | | | | | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

Jungle Initial

   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 | |*| | | | | | |
  +-+-+-+-+-+-+-+-+
3 | | | | | |F| | |
  +-+-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  +-+-+-+-+-+-+-+-+
5 | | | | | | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

Jungle Loaded

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): a
Invalid Input (ijkl)

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): J
Invalid Input (ijkl)

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): j
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
```

```
  +-+-+-+-+-+-+-+-+
2 |*  | | | | | | |
  +-+-+-+-+-+-+-+-+
3 | | | | | |F| | |
  +-+-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  +-+-+-+-+-+-+-+-+
5 | | | | | | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): j
Cannot Move

   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |*  | | | | | | |
  +-+-+-+-+-+-+-+-+
3 | | | | | |F| | |
  +-+-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  +-+-+-+-+-+-+-+-+
5 | | | | | | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): k
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
3 |*| | | | |F| | |
  +-+-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  +-+-+-+-+-+-+-+-+
```

```
5 | | | | | | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): k
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
3 | | | | | |F| | |
  + +-+-+-+-+-+-+-+
4 |*| | | |F| | |H|
  +-+-+-+-+-+-+-+-+
5 | | | | | | | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): k
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
3 | | | | | |F| | |
  + +-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  + +-+-+-+-+-+-+-+
5 |*| | | | | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
```

```
 left(j),down(k),right(l): l
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
3 | | | | | |F| | |
  + +-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  + +-+-+-+-+-+-+-+
5 |  *| | | | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): l
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
3 | | | | | |F| | |
  + +-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  + +-+-+-+-+-+-+-+
5 |    *| | | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): l
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
```

```
3 | | | | | |F| | |
  + +-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  + +-+-+-+-+-+-+-+
5 |      *| | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): l
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
3 | | | | | |F| | |
  + +-+-+-+-+-+-+-+
4 | | | | |F| | |H|
  + +-+-+-+-+-+-+-+
5 |        *| |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): i
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
3 | | | | | |F| | |
  + +-+-+-+-+-+-+-+
4 | | | | |*| | |H|
  + +-+-+-+ +-+-+-+
5 |         | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
```

```
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 2
Enter Move up(i)
 left(j),down(k),right(l): i
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | | | | | |
  + +-+-+-+-+-+-+-+
3 | | | | |*|F| | |
  + +-+-+-+ +-+-+-+
4 | | | | | | | |H|
  + +-+-+-+ +-+-+-+
5 |         | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 2
Enter Move up(i)
 left(j),down(k),right(l): i
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |*| | | |
  + +-+-+-+ +-+-+-+
3 | | | | | |F| | |
  + +-+-+-+ +-+-+-+
4 | | | | | | | |H|
  + +-+-+-+ +-+-+-+
5 |         | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 2
Enter Move up(i)
 left(j),down(k),right(l): l
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
```

```
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |  *| | |
  + +-+-+-+ +-+-+-+
3 | | | | | |F| | |
  + +-+-+-+ +-+-+-+
4 | | | | | | | |H|
  + +-+-+-+ +-+-+-+
5 |         | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 2
Enter Move up(i)
 left(j),down(k),right(l): l
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |    *| |
  + +-+-+-+ +-+-+-+
3 | | | | | |F| | |
  + +-+-+-+ +-+-+-+
4 | | | | | | | |H|
  + +-+-+-+ +-+-+-+
5 |         | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 2
Enter Move up(i)
 left(j),down(k),right(l): k
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F|*| |
  + +-+-+-+ +-+-+-+
4 | | | | | | | |H|
  + +-+-+-+ +-+-+-+
5 |         | |#| |
```

```
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 2
Enter Move up(i)
 left(j),down(k),right(l): k
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | |*|H|
  + +-+-+-+ +-+-+-+
5 |         | |#| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 2
Enter Move up(i)
 left(j),down(k),right(l): k
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | | |H|
  + +-+-+-+ +-+ +-+
5 |         | |*| |
  +-+-+-+-+-+-+-+-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): k
```

```
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | | |H|
  + +-+-+-+ +-+ +-+
5 |         | | | |
  +-+-+-+-+-+-+ +-+
6 | | | |#| | |*| |
  +-+-+-+-+-+-+-+-+
7 | | | | | | | | |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): k
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | | |H|
  + +-+-+-+ +-+ +-+
5 |         | | | |
  +-+-+-+-+-+-+ +-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+ +-+
7 | | | | | | |*| |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): k
Cannot Move

   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
```

```
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | | |H|
  + +-+-+-+ +-+ +-+
5 |         | | | |
  +-+-+-+-+-+-+ +-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+ +-+
7 | | | | | | |*| |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): l
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | | |H|
  + +-+-+-+ +-+ +-+
5 |         | | | |
  +-+-+-+-+-+-+ +-+
6 | | | |#| | | | |
  +-+-+-+-+-+-+ +-+
7 | | | | | | |  *|
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): i
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | | |H|
  + +-+-+-+ +-+ +-+
5 |         | | | |
  +-+-+-+-+-+-+ +-+
6 | | | |#| | | |*|
  +-+-+-+-+-+-+ + +
```

```
7 | | | | | | |   |
  +-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): i
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | | |H|
  + +-+-+-+ +-+ +-+
5 |         | | |*|
  +-+-+-+-+-+-+ + +
6 | | | |#| | | | |
  +-+-+-+-+-+-+ + +
7 | | | | | | | |   |
  +-+-+-+-+-+-+-+-+-+

 LIFE_COUNT is 1
Enter Move up(i)
 left(j),down(k),right(l): i
   0 1 2 3 4 5 6 7
  +-+-+-+-+-+-+-+-+
0 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
1 | |#| | | | | | |
  +-+-+-+-+-+-+-+-+
2 |   | | |     | |
  + +-+-+-+ +-+ +-+
3 | | | | | |F| | |
  + +-+-+-+ +-+ +-+
4 | | | | | | | |*|
  + +-+-+-+ +-+ + +
5 |         | | | |
  +-+-+-+-+-+-+ + +
6 | | | |#| | | | |
  +-+-+-+-+-+-+ + +
7 | | | | | | | |   |
  +-+-+-+-+-+-+-+-+-+

Simba is Home

!Goodbye!

----- Halting the processor -----
```

Here is another long sample run for the input sequence: `llllkkillkjjjkjjjiiiiil` where Simba is killed by a Hyena: SampleRunDead.txt

Submission Instructions

- You must do the programming assignment by yourself. You are permitted to get help from ONLY the TAs and the instructor.
- The file you submit should be a LC-3 assembly language file named **Program4.asm**. A starter version of this file is provided for you. This is the **only** file you need to submit.