Giovanni Anastasio

Dotspeak Assignment

SHRDLU's Blocks World and the Dots World

1. Google SHRDLU and Winograd and read up a bit on the blocks world and why it was of significance in terms of early AI research.
    a. SHRDLU was created by Terry Winograd in 1968 and SHRDLU was created using the programming language Lisp and Micro Planner. The program allows for a user to have a conversation with a computer about a simple block world. The user can ask queries about the block world and tell the computer specific commands to perform that add, remove or manipulate objects in the block world. If the commands/queries asked are not preprogrammed the application will not be able to know what is being asked. SHRDLU was one of the first steps in AI that showed natural language processing in computers. SHRDLU was one of the first attempts to create a useable language understanding machine. SHIRDLU accomplished this task in a basic form and showed that NLP could be programmed into machines opening AI to new possibilities.
2. Write a short text no more than 150 words, which says a little something about SHRDLU's Blocks World, a little something about the Dots world and a little something about the relationship between the two.
    a. The SHRDLU block world in many ways is similar to our Dots world but is also very different. In SHRDLU's block world there are multiple shapes that can be seen in various sizes and colors and questions can be asked about these characteristics. In our Dot world we only have small squares whose size can not be manipulated although we can still have different colored blocks added or removed from the world. Also, SHRDLU's block world can be seen as three dimensional where our Dot world is two dimensional. The worlds are also very similar as they both require some sort of grid world where questions and commands can be asked about the objects in the world. Lastly there is one common goal between the two worlds and that is to model language processing for a computer to understand and both complete this task.

Dotspeak Examples

1. Write down 5-10 short commands that you could use to populate the dot world.
    a. Drop a red block into the world.
    b. Drop a purple block into the third column in the world.
    c. Remove a block from the sixth column in the world if one is present.
    d. Drop a blue block two columns over from your last red block.
    e. Drop a yellow block onto the previous blue block.
    f. Drop a orange block in a column that is next to a red block.
    g. Display the world.
2. Write down 5-10 short queries that you could use to interrogate the world.

a. How many blocks are there in the world?
b. Is there a column with blocks stacked six high?
c. How many red blocks are there in the world?
d. How many green blocks are there in the world?
e. Are two columns of blocks touching one another?
f. How many different colors of blocks are there?
g. How many blocks are there in the tallest column?

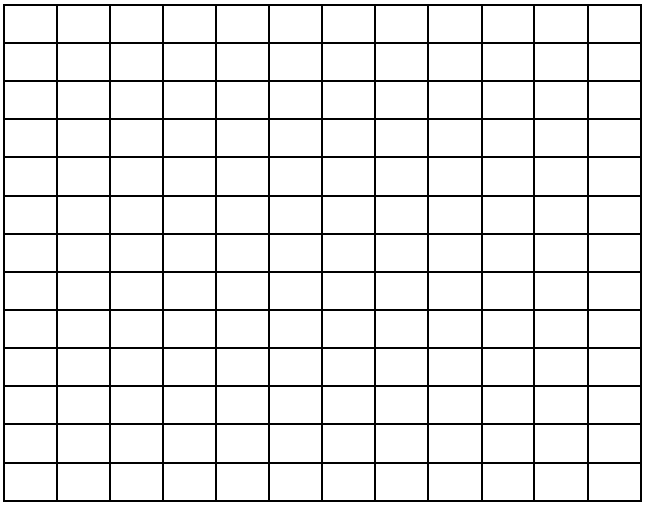
Dotspeak CFG and CFL

1. Carefully craft a CFG that is consistent with the suggestive sentences that you proposed. Be sure to label all productions
    1.) sentence → noun-phrase verb-phrase| noun-phrase | verb-phrase | preposition sentence
    2.) noun-phrase → article noun | article descriptor noun
    3.) verb-phrase → verb noun-phrase
    4.) article → a | the | there | is | if
    5.) noun→ block | world | column | stacked |
    6.) verb→ drop | remove | display | are
    7.) descriptor→ adjective | adjective descriptor | preposition descriptor | noun descriptor | noun-phrase
    8.) adjective→ red | purple | blue | yellow | orange | two | third | sixth | previous | one | six | present | many | different | high | tallest | touching
    9.) preposition → into | to | next | over | in | with | how | another
2. Carefully derive three of your suggestive sentences from the start symbol of your CFG.
    a. Example 1:
        i. Sentence → verb-phrase
        ii. → verb noun-phrase
        iii. →verb article noun
        iv. →display article noun
        v. →display the noun
        vi. → display the world.
    b. Example 2:
        i. Sentence → verb-phrase
        ii. → verb noun-phrase
        iii. → verb article descriptor noun
        iv. → verb article adjective noun descriptor noun
        v. → verb article adjective noun preposition descriptor noun
        vi. → verb article adjective noun preposition noun-phrase noun
        vii. → verb article adjective noun preposition article noun noun
        viii. →Drop article adjective noun preposition article noun noun
        ix. →Drop a adjective noun preposition article noun noun
        x. →Drop a red noun preposition article noun noun
        xi. →Drop a red block preposition article noun noun

xii. →Drop a red block into article noun noun
xiii. →Drop a red block into the noun noun
xiv. →Drop a red block into the block noun
xv. → Drop a red block into the block world.

c. Example 3:
   i. Sentence → Query
   ii. →
   iii. → How many blocks are there in the world?

Dots World "Animation"



Above is the initial state of the world a blank 12X12 grid

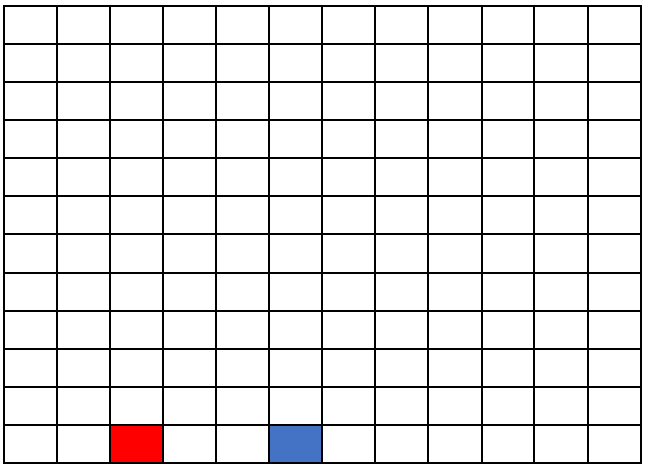
<< Drop a red block into the block world.

<< Drop a blue block two columns over from your last red block.

<< How many red blocks are there in the world?

-1

<< Display the world.

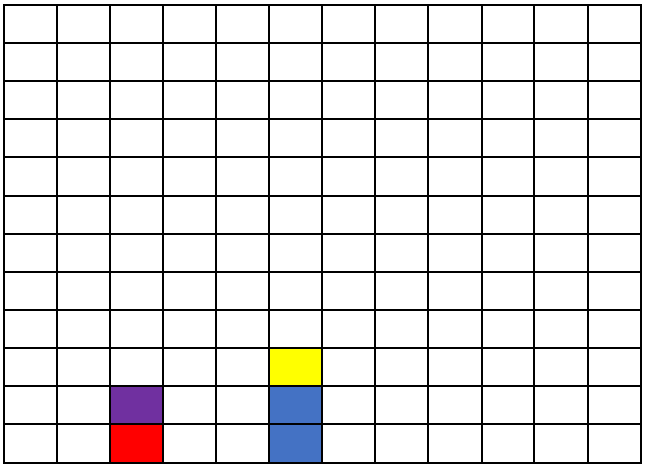


<< Drop a purple block into the third column in the block world.

<< Drop a blue block two columns over from your last red block.

<<Drop a yellow block onto the previous blue block.

<< Display the world.



<< Drop a orange block in a column that is next to a red block.

<< Drop a red block into the block world.

<< How many green blocks are there in the world?

-0

<<Are two columns of blocks touching one another?

-no

<< Display the world.