Assignment 2 Report

Brian Thompson

Ricky Bernstein

Vince Capodanno

Part 1: CSP: Word Search

We tried various options for what to choose as our variables and the domain of values to fill those variables. At first we chose our variables to be the coordinates and the domain to be the possible words that start at this position (the domain size would be twice the size of words due to the fact that they can be horizontal or vertical). The problem with this was that not every coordinate had to have a word starting in it. The next attempt was to still use the coordinates as variables but now have the values be words going through the coordinate. So here, we had to try all the possible ways that a word could go through a certain coordinate, and keep recursing if it’s consistent. This worked for input 1, and after a lot of thought and optimization we got input to run in under a second. However, input 2 never terminated. Our third attempt we switched up the variables and values to have the words as variables and the starting positions as the values in their domain. This led to a much simpler solution that ran very efficiently. We found that trying words from largest length to smallest was best as larger words were more constraining. We also reduced the domain in the beginning by only adding coordinates in the domain such that if the word starts there, it would fit in the puzzle (We didn’t add (8,8) to the domain of any word). We knew what the constraints would be right away as they were pretty obvious. They were that all words must be used exactly once, they can only be put horizontally or vertically, and that no letter may repeat within a given row, column, or 3x3 square.

Input 1 Solution:

L I G H T E N M P

C O N F U S E A Y

S U P W I N D R T

E T U N D R A V H

M R F I C K Y E O

I A O M S H P L N

N G L B A U O I E

A E K L V M U N C

R D S Y E P T G K

Assignment Order:

V, 0 , 7 : MARVELING

V, 1 , 1 : OUTRAGED

H, 1 , 0 : CONFUSE

V, 2 , 0 : SEMINAR

H, 0 , 0 : LIGHTEN

H, 2 , 1 : UPWIND

V, 3 , 3 : NIMBLY

V, 0 , 8 : PYTHON

H, 3 , 1 : TUNDRA

V, 4 , 2 : FOLKS

V, 5 , 5 : HUMP

V, 5 , 8 : NECK

V, 5 , 6 : POUT

H, 4 , 3 : ICKY

V, 5 , 4 : SAVE

V, 2 , 6 : DAY

H, 2 , 0 : SUP

H, 1 , 5 : SEA

V, 4 , 8 : ONE

Number of Nodes expanded: 283

Time: 2.80302596092 seconds

Input 2 Solution:

D R I V E L S U B

C L A M P D O W N

O B S T I N A C Y

Q O V E N B I R D

U A G S Y M B O L

E T L O C K J A W

T I O A R P U N K

R N B L U I D E A

Y G E B X S P I T

H, 1 , 0 : CLAMPDOWN

H, 2 , 0 : OBSTINACY

H, 3 , 1 : OVENBIRD

V, 1 , 0 : COQUETRY

H, 5 , 2 : LOCKJAW

V, 2 , 1 : BOATING

H, 0 , 0 : DRIVELS

H, 4 , 3 : SYMBOL

V, 4 , 2 : GLOBE

H, 6 , 5 : PUNK

V, 5 , 4 : CRUX

H, 7 , 5 : IDEA

V, 3 , 7 : ROAN

H, 8 , 5 : SPIT

H, 6 , 2 : OAR

V, 1 , 4 : PIN

H, 0 , 6 : SUB

V, 6 , 5 : PIS

V, 6 , 3 : ALB

Number of Nodes expanded: 114

Time: 0.828738927841 seconds