Heuristic Document

Heuristic 1

1. Name - Zeros

2. English - If the goal is zero and zero is among the numbers, then multiply all the numbers together.

3. Psuedocode - if ((the goal is zero) and (zero is among the numbers)) then [multiply the numbers together]

4. Examples

    1. Numbers = {5,4,0,8,9} goal = 0
       Solution = (5*(4*(0*(8*9))))

    2. Numbers = {0,5,3,5,8} goal = 0
       Solution = (0*(5*(3*(5*8))))

    3. Numbers = {7,6,7,1,0} goal = 0
       Solution = (7*(6*(7*(1*0))))

Heuristic 2

1. Name - Number Pair and Zero Goal

2. English - If the goal is zero and there is a pair among the numbers, then multiply the difference between the pair of numbers by the product of the remaining numbers.

3. Psuedocode - if ((the goal is zero) and (there is a pair among the numbers)) then [multiply the difference between the pair of numbers by the product of the remaining numbers]

4. Examples

    1. Numbers = {4,5,6,4,9} goal = 0
       Solution = ((4-4)*(5*(6*9)))

    2. Numbers = {5,0,6,0,7} goal = 0
       Solution = ((0-0)*(5*(6*7)))

    3. Numbers = {1,0,1,2,3} goal = 0
       Solution = ((1-1)*(0*(2*3)))

Heuristic 3

1. Name - Nonzero Goal and Zero Number

2. English - If the goal is nonzero and the goal is among the numbers and zero is among the numbers, then add the goal to the product of the remaining numbers.

3. Psuedocode - if ((the goal is nonzero) and (the goal is among the numbers) and (zero is among the numbers)) then [add the goal to the product of the remaining numbers]

4. Examples

    a. Numbers = {7,0,9,2,6} goal = 0
    Solution = (9+(7*(0*(2*6))))

    b. Numbers = {5,4,3,1,0} goal = 0
    Solution = (4+(5*(3*(1*0))))

    c. Numbers = {0,2,3,5,3} goal = 0
    Solution = (3+(0*(2*(3*5))))

Heuristic 4

1. Name - nonzero goal, goal and a pair in numbers

2. English – if the goal is nonzero and there a pair in numbers as well as the goal, then subtract the paired number then multiply the rest non-goal numbers then add the goal to it

3. Psuedocode - if (goal is nonzero) and (goal in numbers) and (pair in numbers) then [subtract the paired number then multiply the rest non-goal numbers then add the goal to it]

4. Examples

    a. Numbers = {5,4,3,3,2} goal = 2
    Solution = (2+((3-3)*(5*4)))

    b. Numbers = {5,5,1,6,2} goal =
    Solution = (2+((5-5)*(1*6)))

    c. Numbers = {1,1,4,5,6} goal = 6
    Solution = (6+((1-1)*(4*5)))

Heuristic 5

1. Name - nonzero goal and zero,one,goal+1 in numbers

2. English - if the goal is nonzero and there is zero and one and a number one bigger than the goal in the numbers, then subtract 1 from the special number then add to the result of zero multiply by the rest numbers

3. Psuedocode - if (goal is nonzero) and (zero in numbers) and (on in numbers) and (goal plus one in numbers) then [subtract 1 from the special number then add to the result of zero multiply by the rest numbers]

4. Examples

    a. Numbers = {7,0,1,9,0} goal = 6
    Solution = ((7-1)+(0*(9*0)))

    b. Numbers = {4,0,1,5,6} goal = 3
    Solution = ((4-1)+(0*(5*6)))

    c. Numbers = {9,0,1,2,3} goal = 8
    Solution = ((9-1)+(0*(2*3)))

Heuristic 6

1. Name - nonzero goal and zero,one,goal-1 in numbers

2. English - if the goal is nonzero and there is zero and one and a number one bigger than the goal in the numbers, then add 1 from the special number then add to the result of zero multiply by the rest numbers

3. Psuedocode - if (goal is nonzero) and (zero in numbers) and (on in numbers) and (goal plus one in numbers) then [add 1 from the special number then add to the result of zero multiply by the rest numbers]

4. Examples

    a. Numbers = {5,0,1,9,0} goal = 6
    Solution = ((5+1)+(0*(9*0)))

    b. Numbers = {2,0,1,5,6} goal = 3
    Solution = ((2+1)+(0*(5*6)))

c. Numbers = {7,0,1,2,3} goal = 8
Solution = ((7+1)+(0*(2*3)))

Heuristic 7

1. Name - two pairs and a zero with 1 being the goal

2. English – if there are two pairs in the numbers and goal is 1 and zero also in numbers then divide each paired numbers then divided the results again then plus 0

3. Psuedocode - if (two pair in numbers) and (goal is one) and (zero in numbers) then [divide each paired numbers then divided the results again then plus 0]

4. Examples

   a. Numbers = {2,2,3,3,0} goal = 1
   Solution = (((2/2)/(3/3))+0)

   b. Numbers = {3,3,4,4,0} goal = 1
   Solution = (((4/4)/(3/3))+0)

   c. Numbers = {5,5,6,6,0} goal = 1
   Solution = (((6/6)/(5/5))+0)

Heuristic 8

1. Name - two paired numbers and a 0 with 2 being the goal

2. English - if there are two pairs in the numbers and goal is 2 and zero also in numbers then divide each paired numbers then add the results again then add 0

3. Psuedocode - if (two pair in numbers) and (goal is two) and (zero in numbers) then [divide each paired numbers then add the results again then plus 0]

4. Examples

   a. Numbers = {6,6,5,5,0} goal = 2
   Solution = (((6/6)+(5/5))+0)

   b. Numbers = {4,4,5,5,0} goal = 2
   Solution = (((4/4)+(5/5))+0)

   c. Numbers = {2,3,2,3,0} goal = 2
   Solution = (((2/2)+(3/3))+0)