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USN : 1BM18CS011 Sem : 5

AI Lab Test - 1

Question number : 8 puzzle A^* heuristic

```
class Puzzle: self.n = size
  def heur ( self, start, target ): # heuristic function for A*
      return self.h(start.data, target) + start.level

  def h( self, start, target ):
      temp = 0
      for i in range (0, self.n):
          for j in range (0, self.n):
              if start[i][j] != target[i][j]
                  and start[i][j] != '__':
                  temp += 1
      return temp

class State :
    def __init__( self, data, level, fval ):
        self.data = data
        self.level = level
        self.fval = fval

    def gen (self):
        a, b = self.find (self.data, '__')
        val_list = [[a, b-1], [a, b+1], [a-1, b], [a+1, b]]
        children = []
        for i in val_list :
            c = self.shuffle (self.data, a, b, i[0], i[1])
            if child is not None :
                child_node = Node (c, self.level+1, 0)
                children.append (child_node)
        return children
```

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```
def shuffle ( self , puzzle, a1, b1 , a2, b2 ) :
    if a2 >= 0 and a2 < len (self.data)
                and b2 >= 0 and b2 < len ( self data) :
        tempp = [ ]
        tempp = self.copy(puzzle)
        temp = tempp [a2][b2]
        tempp [a2][b2] = tempp [a1][b1]
        tempp [a1][b1] = temp
        return tempp
    else :
        return None
def emptyslot ( self , puzzle, a ) :
    for i in range (0, len (self.data)) :
        for j in range ( 0, len ( self.data) ) ;
            if puzzle[i][j] = a :
                return i, j

class Puzzle contd :
    def process ( self) :
        st = Node (st , 0, 0 )
        St. fval = self. heur ( start , target )
        self. open. append (start)
        Print ("\n")
        while True :
            curr = self. open [0 ]
            for i in curr.data :
                for j in i :
                    print (j, end = " ")
                print (end = " ")
        if (self. h(cur.data , target ) == 0 )
                break
```

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```
for i in curr.gen():
    i.fval = self.heur(i, target)
    self.open.append(i)
self.closed.append(curr)
del self.open[0]
self.open.sort(key = lambda a: a.fval, reverse = False)
```

~~def main():~~

~~puzzle = Puzzle()~~