EXNO:02 Design the tower of hanoi problem using search algorithm

DATE:

AIM:

To design the tower of hanoi problem using search algorithm

Algorithm :

Step1: Import the `turtle` module.

Step2: Define classes `Disc` and `Tower` for disc visualization and tower management.

Step3: Implement the recursive `hanoi()` function to solve the Tower of Hanoi problem.

Step4: Create towers and discs, and set up the game interface.

Step5: Run the main function and enter the event loop using `mainloop()`.

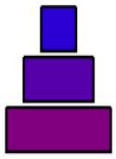
Code:

```
from turtle import *
class Disc(Turtle):
    def __init__(self, n):
        Turtle.__init__(self, shape="square", visible=False)
        self.pu()
        self.shapesize(1.5, n*1.5, 2)  # square --> rectangle
        self.fillcolor(n/6., 0, 1-n/6.)
        self.st()
class Tower(list):
    "Hanoi tower, a subclass of built-in type list"
    def __init__(self, x):
        "create an empty tower. x is x-position of peg"
        self.x = x
    def push(self, d):
        d.setx(self.x)
```

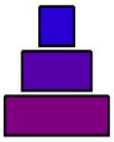
```
        d.sety(-150 + 34 * len(self))
        self.append(d)
    def pop(self):
        d = list.pop(self)
        d.sety(150)
        return d
def hanoi(n, source, auxiliary, target):
    if n > 0:
        hanoi(n - 1, source, target, auxiliary)
        target.push(source.pop())
        hanoi(n - 1, auxiliary, source, target)
def play():
    onkey(None, "space")
    clear()
    try:
        hanoi(3, t1, t2, t3)
        write("press STOP button to exit",
              align="center", font=("Courier", 16, "bold"))
    except Terminator:
        pass  # turtledemo user pressed STOP
def main():
    global t1, t2, t3
    ht(); penup(); goto(0, -225)  # writer turtle
    t1 = Tower(-150)
    t2 = Tower(0)
    t3 = Tower(150)
```

```
    # make tower of 3 discs
    for i in range(3, 0, -1):
        t1.push(Disc(i))
    # prepare Spartan user interface ;-)
    write("press spacebar to start game",
          align="center", font=("Courier", 16, "bold"))
    onkey(play, "space")
    listen()
    return "EVENTLOOP"
if __name__ == "__main__":
    msg = main()
    print(msg)
    mainloop()
```

Output:



press spacebar to start game



press STOP button to exit

Observation -20	
Record -5	
Total - 25	

Result:

Thus, the python program for designing the tower of hanoi problem using search algorithm is executed successfully