

TASK 4-Mini-Max algorithm

PROGRAM

Initial values of Alpha and Beta

MAX, MIN = 1000, -1000

Returns optimal value for current player

(Initially called for root and maximizer)

def minimax(depth, nodeIndex, maximizingPlayer, values, alpha, beta):

Terminating condition. i.e. leaf node is reached

if depth == 3:

return values[nodeIndex]

if maximizingPlayer:

best = MIN

Recur for left and right children

for i in range(0, 2):

val = minimax(depth + 1, nodeIndex * 2 + i, False, values, alpha, beta)

best = max(best, val)

alpha = max(alpha, best)

Alpha Beta Pruning

if beta <= alpha:

break

return best

else:

best = MAX

Recur for left and right children

for i in range(0, 2):

val = minimax(depth + 1, nodeIndex * 2 + i, True, values, alpha, beta)

best = min(best, val)

beta = min(beta, best)

Alpha Beta Pruning

if beta <= alpha:

```
break
```

```
return best
```

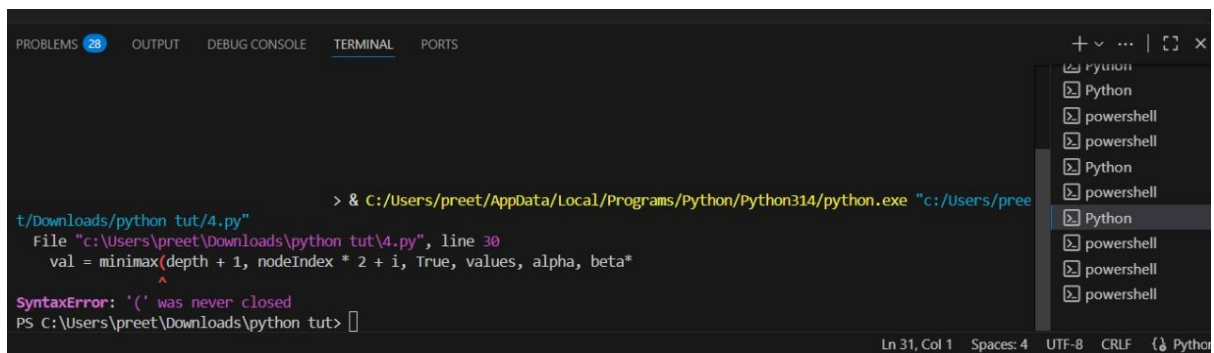
```
# Driver Code
```

```
if __name__ == "__main__":
```

```
    values = [3, 5, 6, 9, 1, 2, 0, -1]
```

```
    print("The optimal value is:", minimax(0, 0, True, values, MIN, MAX))
```

OUTPUT



The screenshot shows a VS Code terminal window with the following content:

```
> & C:/Users/preet/AppData/Local/Programs/Python/Python314/python.exe "c:/Users/preet/Downloads/python tut/4.py"
File "c:/Users/preet/Downloads/python tut/4.py", line 30
    val = minimax(depth + 1, nodeIndex * 2 + i, True, values, alpha, beta*
    ^
SyntaxError: '(' was never closed
PS C:/Users/preet/Downloads/python tut>
```

The error message indicates a syntax error in the file "c:/Users/preet/Downloads/python tut/4.py" at line 30. The error is a "SyntaxError: '(' was never closed", which is caused by an unclosed parenthesis in the function call to minimax. The terminal window also shows a list of open files on the right, including python, Python, and powershell.