Program for page replacement algorithm

1) FIFO

#FIFO page replacement algorithm implementation in python

print("Enter the number of frames: ",end="")

capacity = int(input())

f,fault,top,pf = [],0,0,'No'

print("Enter the reference string: ",end="")

s = list(map(int,input().strip().split()))

print("\nString|Frame →\t",end='')

for i in range(capacity):

print(i,end=' ')

print("Fault\n ↓\n")

for i in s:

if i not in f:

if len(f)<capacity:

f.append(i)

else:

f[top] = i

top = (top+1)%capacity

fault += 1

pf = 'Yes'

else:

pf = 'No'

print(" %d\t\t"%i,end='')

for x in f:

print(x,end=' ')

for x in range(capacity-len(f)):

print(' ',end=' ')

print(" %s"%pf)

print("\nTotal requests: %d\nTotal Page Faults: %d\nFault Rate: %0.2f%%"%(len(s),fault,(fault/len(s))\*100))

output:

Enter the number of frames: 3

Enter the reference string: 1 2 3 4 1 6 7 8 2

String|Frame → 0 1 2 Fault

↓

1 1 Yes

2 1 2 Yes

3 1 2 3 Yes

4 4 2 3 Yes

1 4 1 3 Yes

6 4 1 6 Yes

7 7 1 6 Yes

8 7 8 6 Yes

2 7 8 2 Yes

Total requests: 9

Total Page Faults: 9

Fault Rate: 100.00%

2) LRU

#LRU page replacement algorithm implementation in python

print("Enter the number of frames: ",end="")

capacity = int(input())

f,st,fault,pf = [],[],0,'No'

print("Enter the reference string: ",end="")

s = list(map(int,input().strip().split()))

print("\nString|Frame →\t",end='')

for i in range(capacity):

print(i,end=' ')

print("Fault\n ↓\n")

for i in s:

if i not in f:

if len(f)<capacity:

f.append(i)

st.append(len(f)-1)

else:

ind = st.pop(0)

f[ind] = i

st.append(ind)

pf = 'Yes'

fault += 1

else:

st.append(st.pop(st.index(f.index(i))))

pf = 'No'

print(" %d\t\t"%i,end='')

for x in f:

print(x,end=' ')

for x in range(capacity-len(f)):

print(' ',end=' ')

print(" %s"%pf)

print("\nTotal Requests: %d\nTotal Page Faults: %d\nFault Rate: %0.2f%%"%(len(s),fault,(fault/len(s))\*100))

OUTPUT:

Enter the number of frames: 3

Enter the reference string: 1 2 3 4 1 6 7 8 2

String|Frame → 0 1 2 Fault

↓

1 1 Yes

2 1 2 Yes

3 1 2 3 Yes

4 4 2 3 Yes

1 4 1 3 Yes

6 4 1 6 Yes

7 7 1 6 Yes

8 7 8 6 Yes

2 7 8 2 Yes

Total Requests: 9

Total Page Faults: 9

Fault Rate: 100.00%

3) OPTIMAL

#Optimal page replacement algorithm (OPT or OPR) implementation in python

print("Enter the number of frames: ",end="")

capacity = int(input())

f,fault,pf = [],0,'No'

print("Enter the reference string: ",end="")

s = list(map(int,input().strip().split()))

print("\nString|Frame →\t",end='')

for i in range(capacity):

print(i,end=' ')

print("Fault\n ↓\n")

occurance = [None for i in range(capacity)]

for i in range(len(s)):

if s[i] not in f:

if len(f)<capacity:

f.append(s[i])

else:

for x in range(len(f)):

if f[x] not in s[i+1:]:

f[x] = s[i]

break

else:

occurance[x] = s[i+1:].index(f[x])

else:

f[occurance.index(max(occurance))] = s[i]

fault += 1

pf = 'Yes'

else:

pf = 'No'

print(" %d\t\t"%s[i],end='')

for x in f:

print(x,end=' ')

for x in range(capacity-len(f)):

print(' ',end=' ')

print(" %s"%pf)

print("\nTotal requests: %d\nTotal Page Faults: %d\nFault Rate: %0.2f%%"%(len(s),fault,(fault/len(s))\*100))

output:

Enter the number of frames: 3

Enter the reference string: 1 2 3 4 1 6 7 8 2

String|Frame → 0 1 2 Fault

↓

1 1 Yes

2 1 2 Yes

3 1 2 3 Yes

4 1 2 4 Yes

1 1 2 4 No

6 6 2 4 Yes

7 7 2 4 Yes

8 8 2 4 Yes

2 8 2 4 No

Total requests: 9

Total Page Faults: 7

Fault Rate: 77.78%