ExperimentNo.:-2

WriteaprogramtoimplementHuffmanEncodingu singagreedystrategy.

Source Code:-

In[1]:

**import**heapq

**class**Node:

**def**init(self, freq, symbol, left**=None**, right**=None**):self**.**freq**=**freq self**.**symbol**=**symbols

elf**.**left**=**left self**.**right**=**right self**.**huff**=**""

**def**lt(self,other): **return**self**.**freq**<**other**.**freq

**def**printNodes(node,val**=**""):newval**=**v al**+**node**.**huff **if**node**.**left**or**node**.**right:

**if**node**.**left:

printNodes(node**.**left,newval)

**if**node**.**right:

printNodes(node**.**right,newval)

**else**:

print(f"{node**.**symbol}->{newval}") encoded\_lengths[node**.**symbol]**=**len(newval)

*#Gettinguserinputforcharactersandtheirfrequencies*

num\_chars**=**int(input("Enternumberofcharacters:"))chars

**=**[]

freqs**=**[]

**for**i**in**range(num\_chars): char**=**input(f"Entercharacter{i**+**1}:")

freq**=**int(input(f"Enterfrequencyofcharacter{char}:"))chars**.**

append(char) freqs**.**append(freq)node

s**=**[]

**for**i**in**range(len(chars)): heapq**.**heappush(nodes,Node(freqs[i],chars[i]))

**while**len(nodes)**>**1: left **=**

heapq**.**heappop(nodes)right**=**heap

left**.**huff**=**"0" right**.**huff**=**"1"

newnode**=**Node(left**.**freq**+**right**.**freq,left**.**symbol**+**right**.**symbol,left,right)heapq**.**he appush(nodes,newnode)

*#Calculatingtotalsizebeforeencoding*

total\_size\_before**=**sum(freqs)**\***8

*#Printingthenodesandcalculatingencodedlengths*

encoded\_lengths**=**{}pr intNodes(nodes[0])

*#Calculatingtotalsizeafterencoding*

total\_size\_after**=**sum(freqs[i]**\***encoded\_lengths[chars[i]]**for**i**in**range(num\_chars))

*#CalculatingEncodedDataRepresentation* characters**=**num\_chars**\***8fre quency**=**sum(freqs)

encoded\_data\_representation**=**characters**+**frequency**+**total\_size\_after

print("\nTotalsizebeforeencoding:",total\_size\_before,"bits")print("Totalsizeaf terencoding:",total\_size\_after,"bits") print("EncodedDataRepresentation:",encoded\_data\_representation,"bits")

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Enter  Enter  Enter | numberof  character  frequency | characters:4  1:B  ofcharacter | B: | 1 |
| Enter  Enter | character  frequency | 2:C  ofcharacter | C: | 6 |
| Enter  Enter | character  frequency | 3:A  ofcharacter | A: | 5 |
| Enter  Enter | character  frequency | 4:D  ofcharacter | D: | 3 |
| C-> | 0 |  |  |  |
| B-> | 100 |  |  |  |
| D-> | 101 |  |  |  |
| A-> | 11 |  |  |  |

Totalsizebeforeencoding:120bitsTota lsizeafterencoding:28bits EncodedDataRepresentation:75bits

In[]: