

Report

Programming Language Lab

Group Number 16

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Number to character and character to number mapping table

0=*, 1=`, 2=~ , 3=!, 4=@, 5=#, 6=\$, 7=%, 8=^, 9=&

Question 3(c):-

Range of Ascii value of small letter alphabet is from 97 to 122.

A. Algorithm for Encryption

This is recursively implemented. Plain Text is taken as combination of head and tail of list of character where head is current index element and tail is rest of the string from that index to last index.

Index = 0

1. check recursively while plain text is not empty

2. if head is a capital letter

3. if yes just print and go to step 1

4. else if it is small letter then

sum = ascii value of head + ascii value of key[index]

while sum > 122

sum = sum - 26

print character corresponding to sum

index++

go to step 1

5. else

if it integer then print corresponding special character from above table

go to step 1

Example :-

Plain Text :- Hello90e

Key :- iitg

H(cap)	e(101)	l(108)	l(108)	o(111)	9	0	e(101)
no change	i(105)	i(105)	t(116)	g(103)	put &	put *	i(105)
index=0	index=0	index=1	index=2	index=3	index=0	index=0	index=0

*****After addition we get*****

H	206	203	224	214	&	*	206
after wrapping by subtracting 26 till less than 122							
H	f(102)	m(109)	x(120)	n(110)	&	*	f(102)

so the corresponding cypher text is “**Hfmxn&*f**”.

Smallest value that we will get after plain text character by key character (addition of ascii values) is 194 (97+97(if head is ‘a’ and key[index] is ‘a’ too).

Largest value that we will get after plain text character by key character (addition of ascii values) is 244(122+122(if head is ‘z’ and key[index] is ‘z’ too).

These smallest and largest value will be used for decryption part.

B. Algorithm for Decryption:-

This is recursively implemented. Cypher Text is taken as combination of head and tail of list of character where head is current index element and tail is rest of the string from that index to last index.

Index = 0

1. check recursively while cypher string is not empty

2. if head is capital letter

3. if yes print and go to step 1

4. else if it small letter then

 val = ascii value of head

 while val < 194 (lowest sum we can get while encrypting)

 val = val +26

 val = val – ascii value of key[index]

 if val > 122

 val = val – 26

 if val < 97

 val = val + 26

 print character corresponding to val

 index ++

 go to step 1

5. else

 if it special character then print corresponding integer from above table

 go to step 1

Example:-

Cypher Text = Hfmxn&*f

key = iitg

len = length(iitg) = 4

currentCharacter = H

index = 0

currentCharacter is capital ,print H

currentCharacter = f, keyCharacter = i

value = asciiValue(f) = 102, keyValue = asciiValue(i) = 105

so value + 26 = 128 + 26 = 154 + 26 = 190 + 26 = 206

value = value - 206 - 105 = 101 corresponding character = e, print e, (index++)%len

currentCharacter = m ,keyCharacter = I

value = asciiValue(m) = 109, keyValue = asciiValue(i) = 105

value + 26 = 135 + 26 = 161 + 26 = 187 + 26 = 213

value = value - keyValue = 108 , corresponding character = l ,print l, (index++)%len

currentCharacter = x, keyCharacter = t

value = asciiValue(x) = 120, keyValue = asciiValue(t) = 116

value = 120 + 26 = 146 + 26 = 172 + 26 = 198

value = 198 - 116 = 82 since value is less than 97 so add 26 to value.

Value = 82 + 26 = 108, corresponding character l ,print l , (index++)%len;

currentCharacter = n ,keyCharacter = g

value = asciiValue(n) = 110, keyValue = asciiValue(g) = 103

value = 110 + 26 = 136 + 26 = 162 + 26 = 188 + 26 = 214

value = 214 - 103 = 108, corresponding character o ,print o , (index + 1)%len

currentCharacter = & , special Character print corresponding value from above table, index

currentCharacter = * , special Character print corresponding value from above table, index

currentCharacter = f, keyCharacter = i

value = asciiValue(f) = 102 , keyValue = asciiValue(i) = 105

so value + 26 = 128 + 26 = 154 + 26 = 190 + 26 = 206

value = value - 206 - 105 = 101 corresponding character = e, print e, (index++)%len

therefore, final plain text is "Hello90e".

I used linux to run the programs

Command to run the programs

- 1. Navigate to corresponding directory.**
- 2. type ghc file.hs and press enter**
- 3. type ./file and press enter**