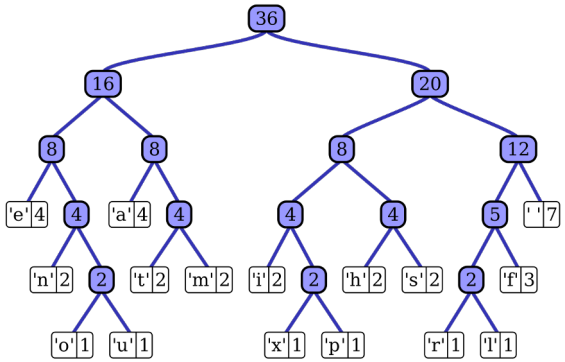
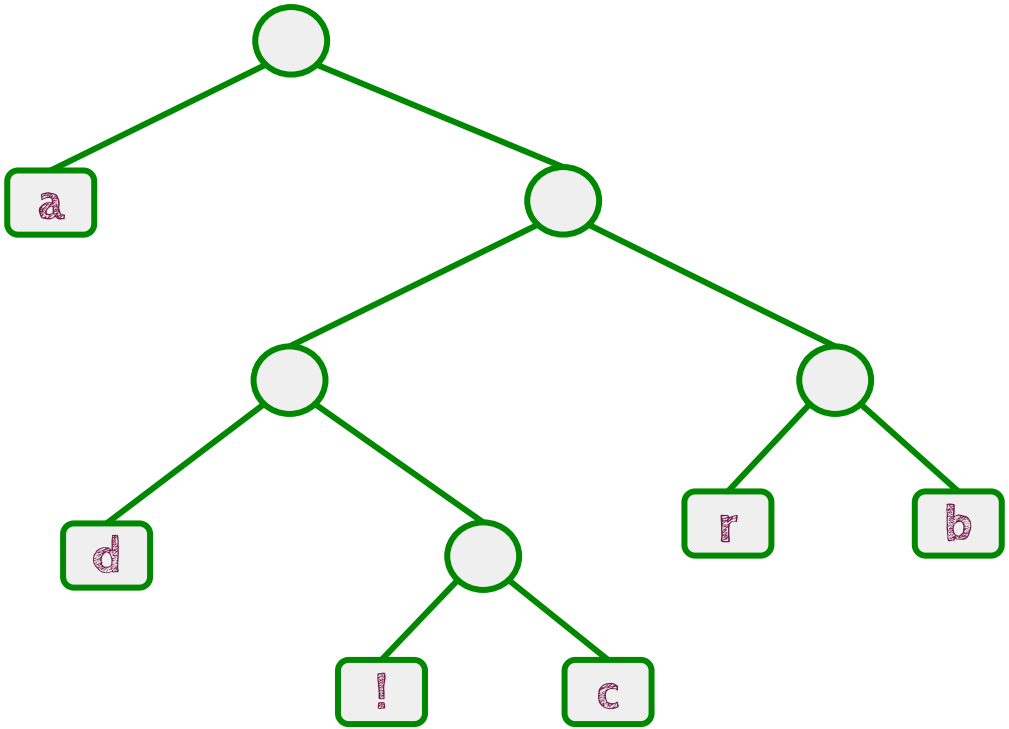
Huffman agacı ve kodlama



color	freq.	bit code
	14	0
	6	10
	3	110
	2	111

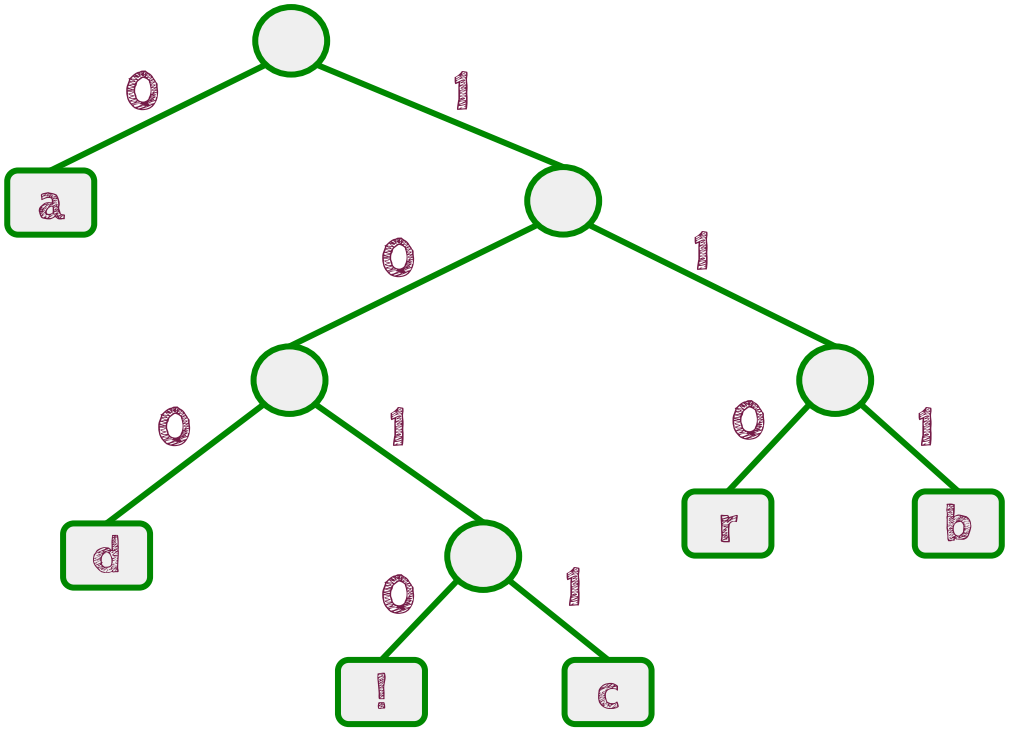
Suhap SAHIN
Onur GÖK

Huffman Kodlama



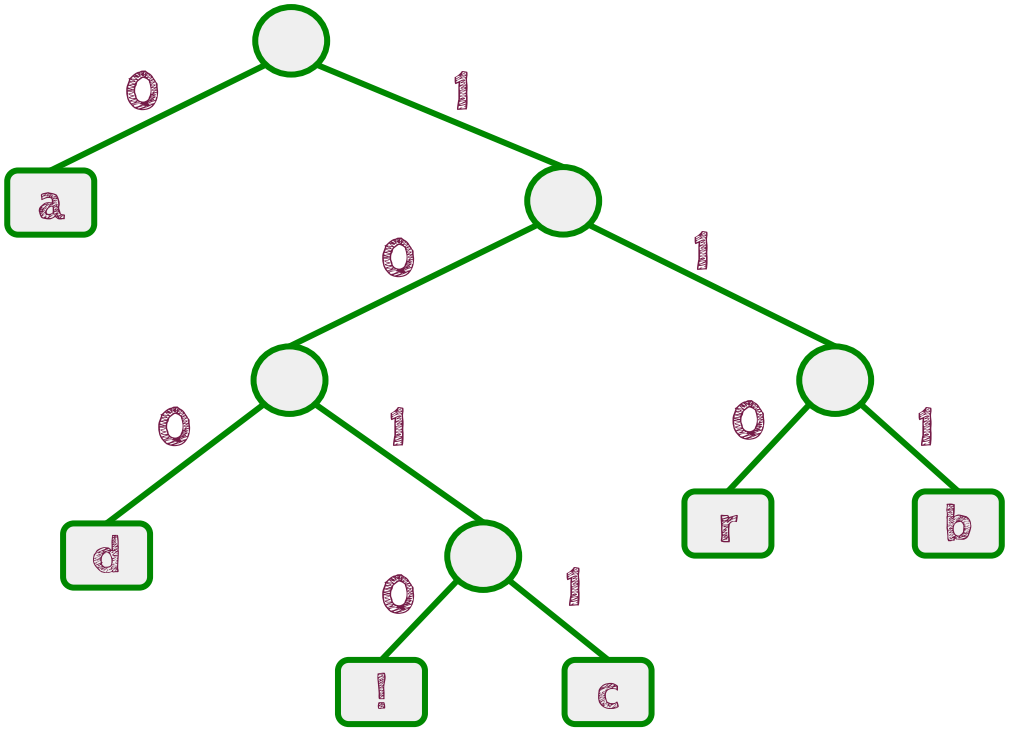
karakter	kodlama
a	
b	
c	
d	
r	
!	

Huffman Kodlama



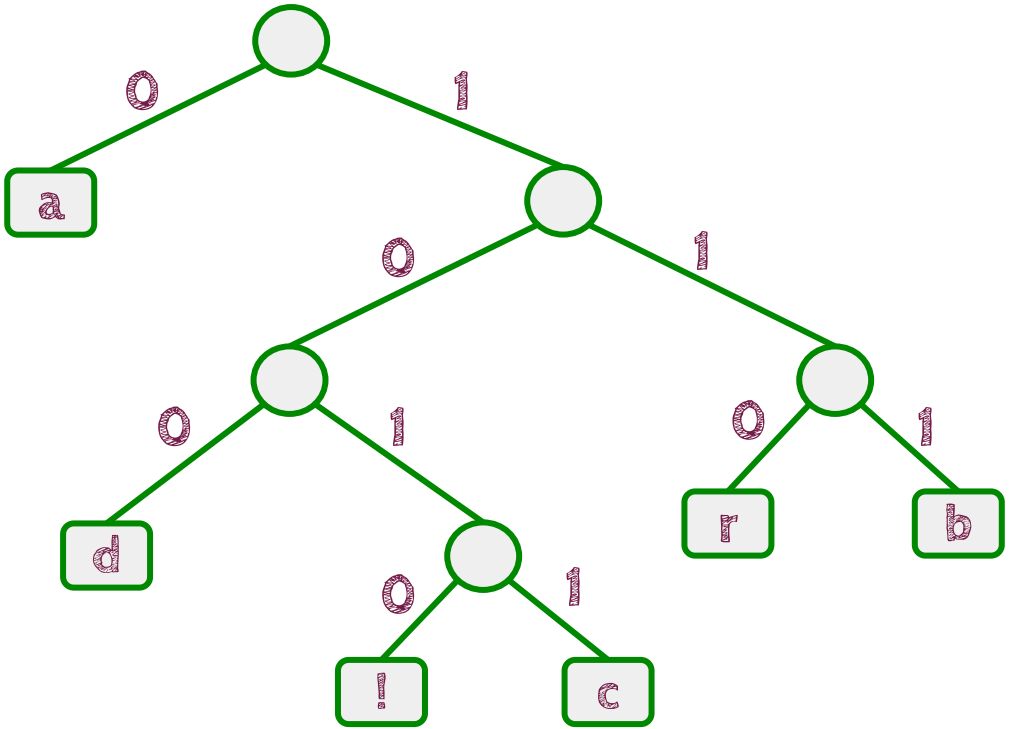
karakter	kodlama
a	
b	
c	
d	
r	
!	

Huffman Kodlama



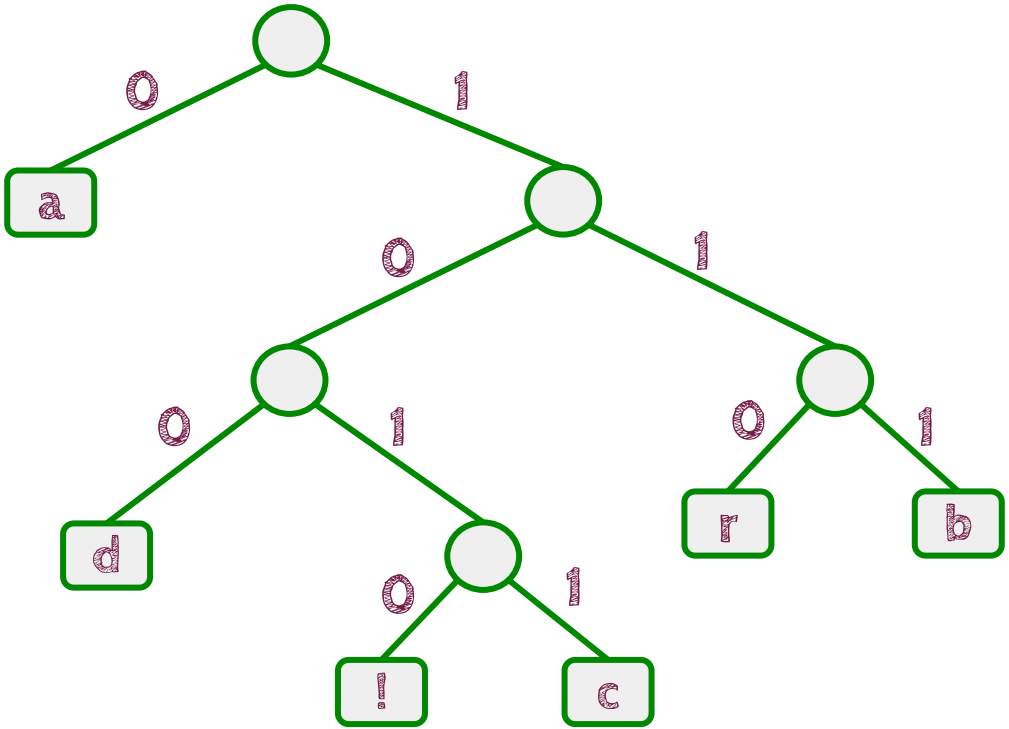
karakter	kodlama
a	0
b	
c	
d	
r	
!	

Huffman Kodlama



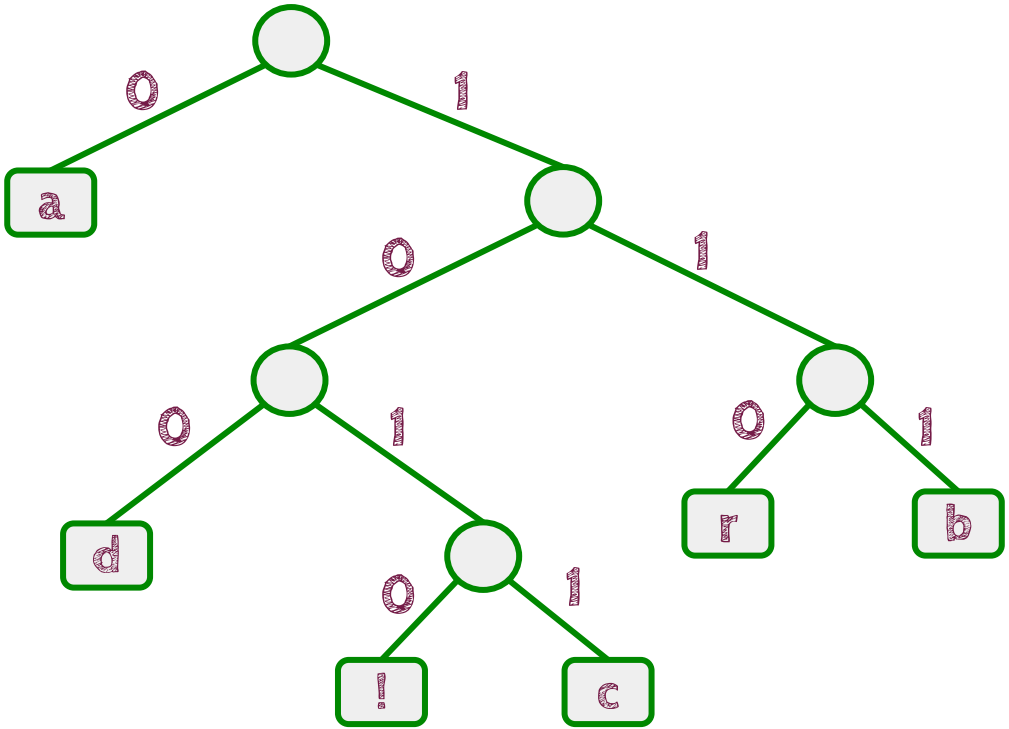
karakter	kodlama
a	0
b	111
c	
d	
r	
!	

Huffman Kodlama



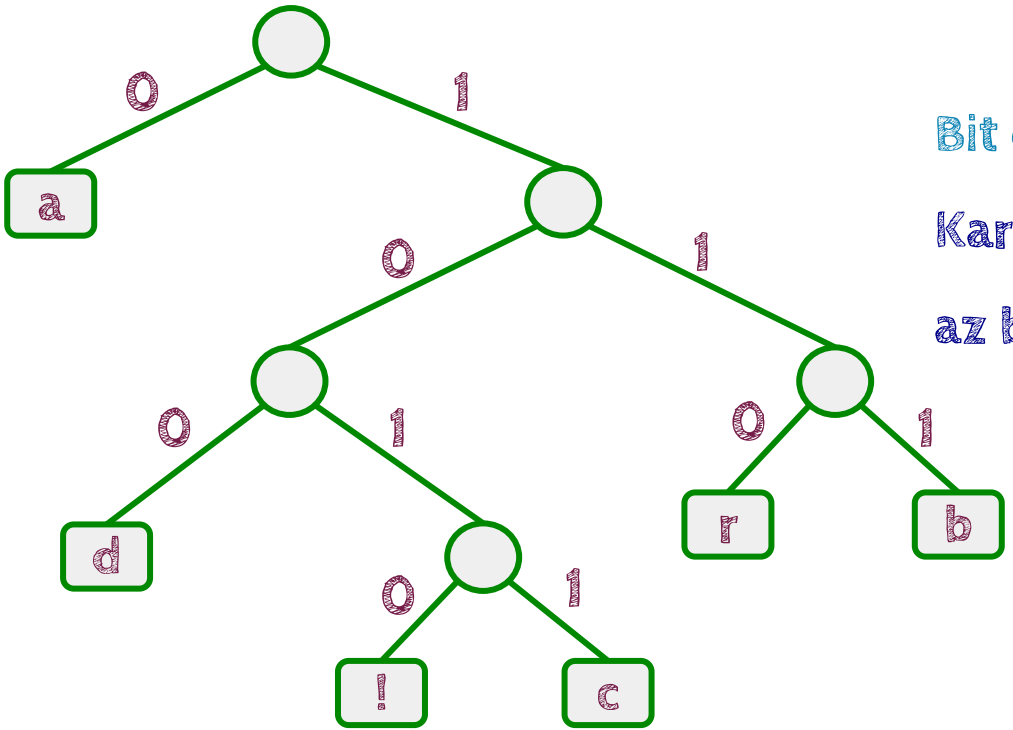
karakter	kodlama
a	0
b	111
c	1011
d	
r	
!	

Huffman Kodlama



karakter	kodlama
a	0
b	111
c	1011
d	100
r	110
!	1010

Huffman Kodlama

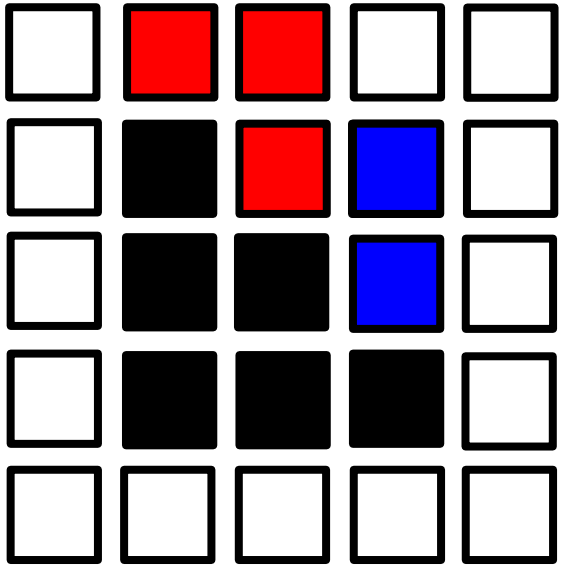


Bit düzeyinde sıkıstırma

Karakterleri frekansına göre daha az bit degeriyle tutmak

Huffman Kodlama

istatiksel olarak kodlama yapılır



renk	tekrar	kod	maliyet	maliyet
	14	0	14	42
	6	10	12	18
	3	110	9	6
	2	111	6	6

Frekans bulma

CERACECCERCERACECECRCECCCECE

Karakterler	C	E	R	A
Frekansları	12	9	4	2

Kodlama

C E R A C E C C E R C E R A C E C E C R C E C C E C E

Karakterler	C	E	R	A
Frekansları	12	9	4	2

Örn: Frekans Bulma

Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

Örn: Agac olusturma

13	18	22	45	45	53	65
l	o	s	a	n	t	e

Kuyruk iki veya daha fazla dügüm içeriyorsa:

Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

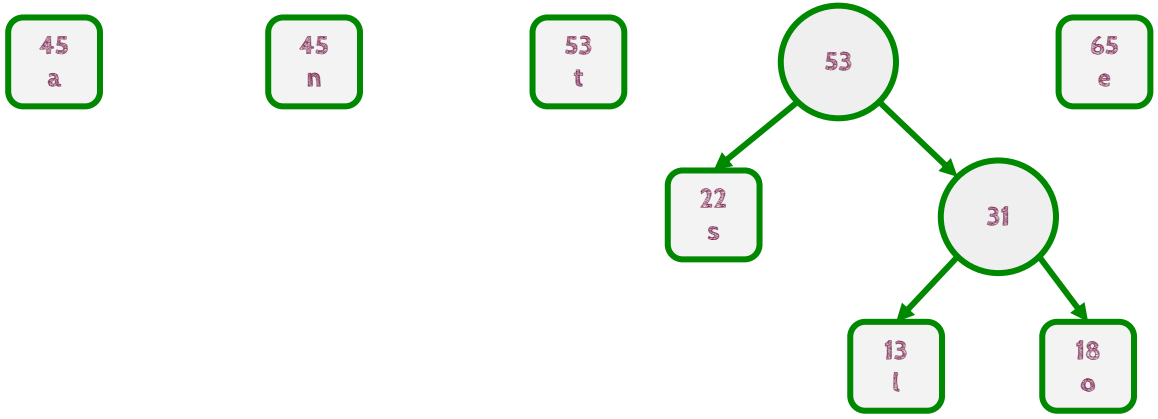
Örn: Agac olusturma

Kuyruk iki veya daha fazla dügüm içeriyorsa:

- Yeni dügüm olustur
- Kuyruktaki ilk dügümü al, yeni dügüm sol çocuk yap
- Kuyruktaki ikinci dügümü al, yeni dügüm sag çocuk yap
- Yeni dügümün degerini çocukların karakter toplamı yap
- Yeni dügümün kuyruktaki yerini bul yerlestir.

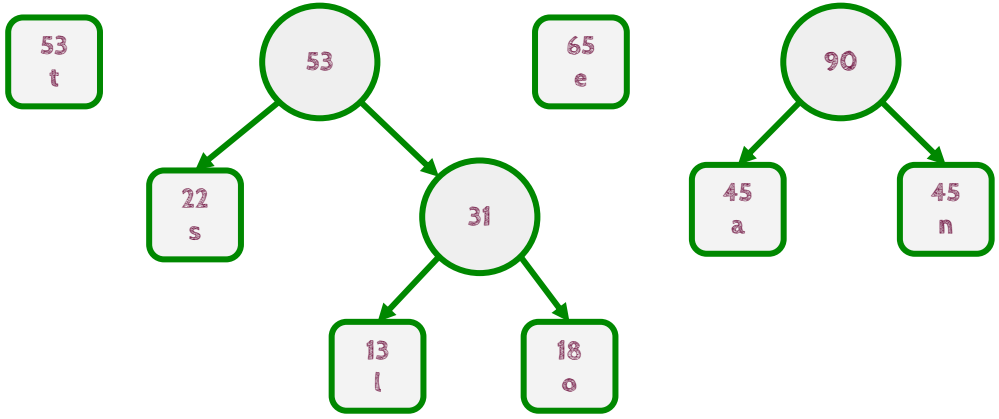
Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

Örn: Agac olusturma



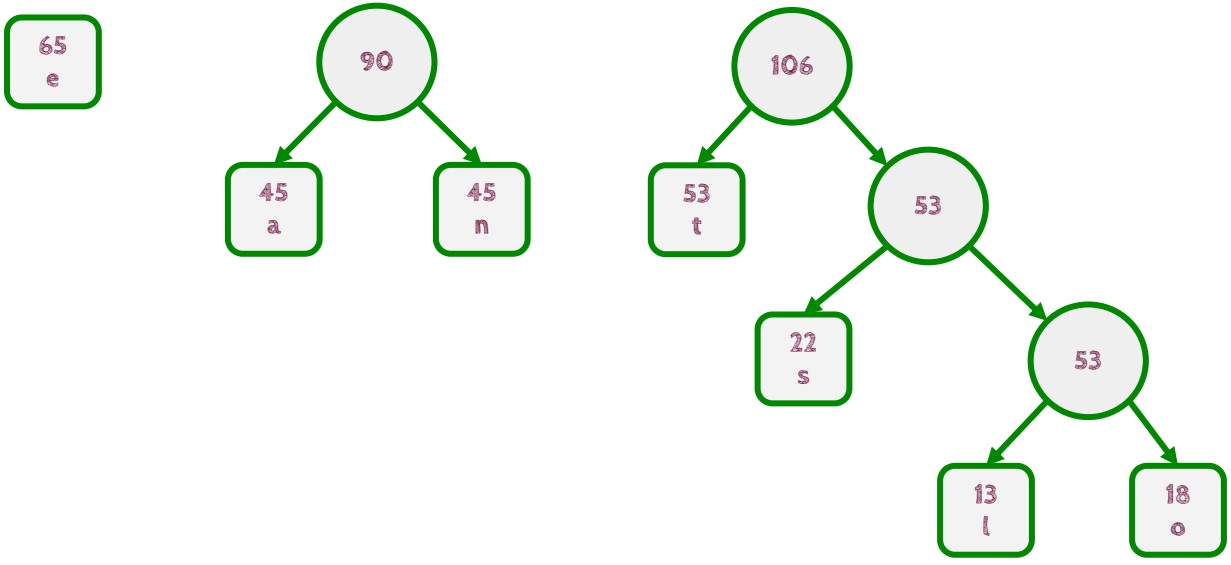
Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

Örn: Agac olusturma



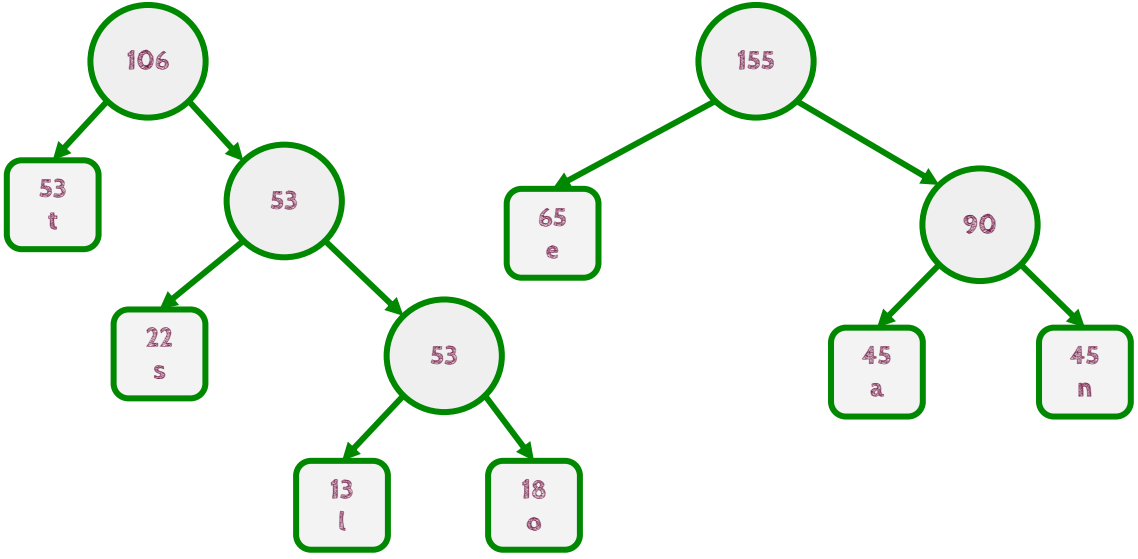
Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

Örn: Agac olusturma



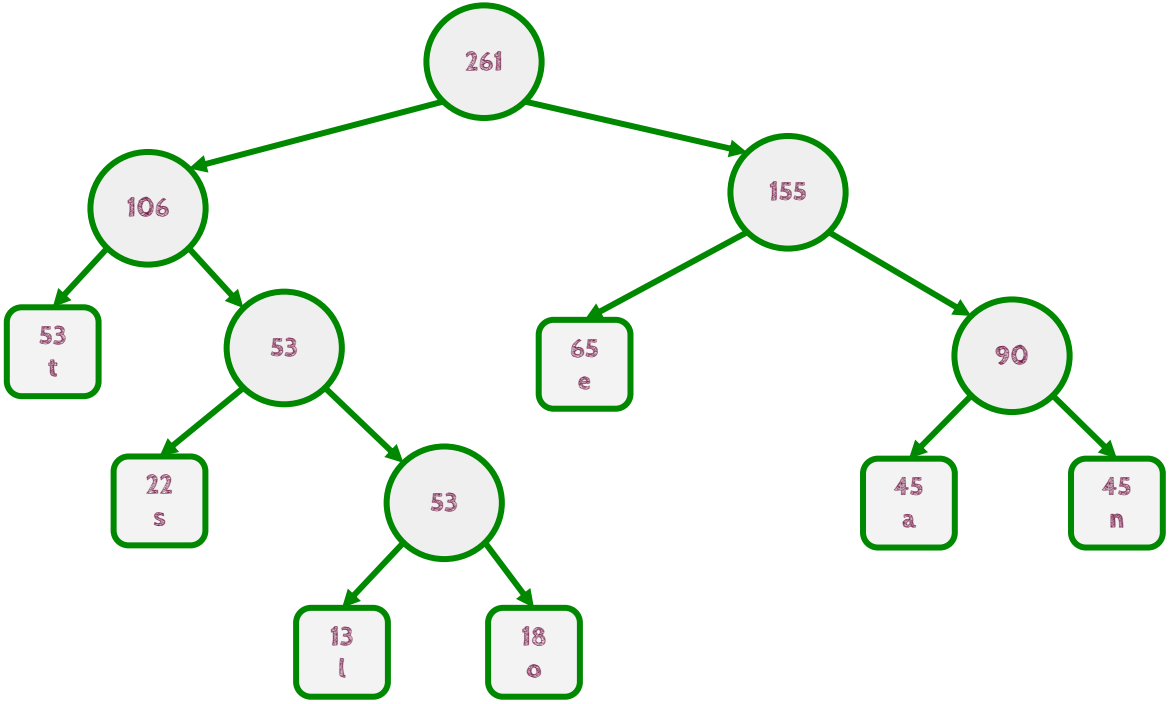
Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

Örn: Agac olusturma



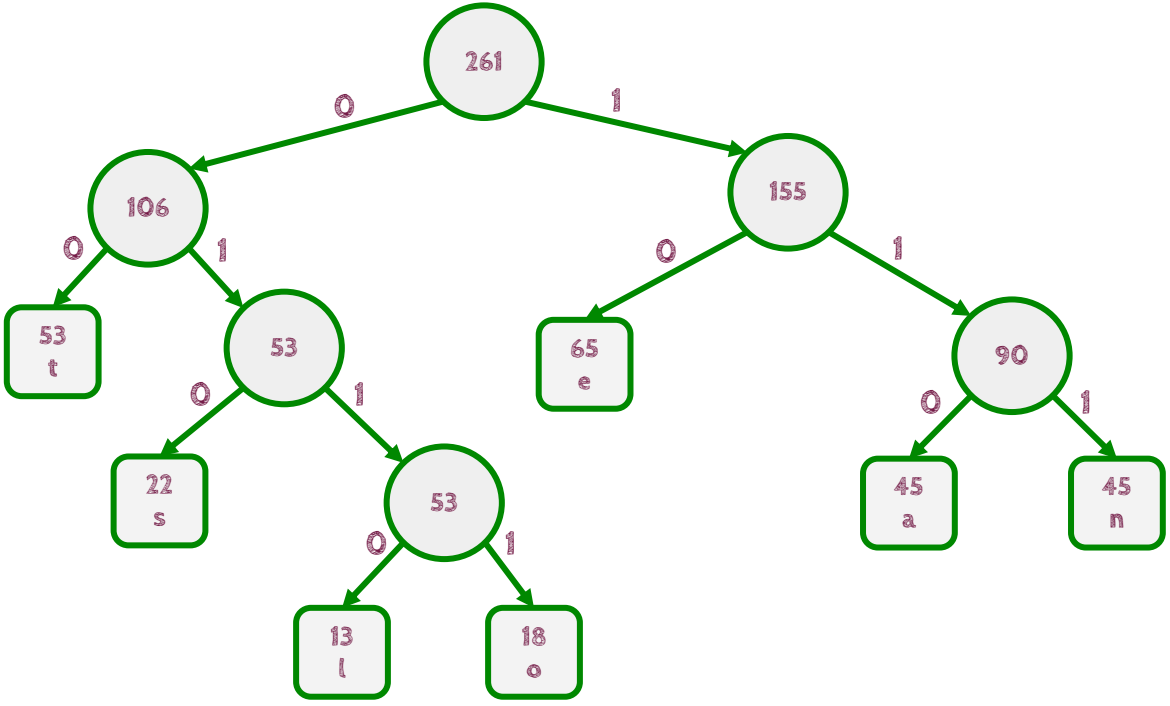
Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

Örn: Agac olusturma



Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

Örn: Kodlama



Karakter	t	s	o	n	l	e	a
Huffman Kodu	00	010	0111	111	0110	10	110

Metin Olusturma

Karakter	t	s	o	n	l	e	a
Frekans	53	22	18	45	13	65	45

Frekans * Bit sayısı :

(53+22+18+45+13+65+45) *8

= 261 * 8

= 2088

Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char
0	0	[NULL]	32	20	[SPACE]	64	40	@	96	60	`
1	1	[START OF HEADING]	33	21	!	65	41	A	97	61	a
2	2	[START OF TEXT]	34	22	"	66	42	B	98	62	b
3	3	[END OF TEXT]	35	23	#	67	43	C	99	63	c
4	4	[END OF TRANSMISSION]	36	24	$	68	44	D	100	64	d
5	5	[ENQUIRY]	37	25	%	69	45	E	101	65	e
6	6	[ACKNOWLEDGE]	38	26	&	70	46	F	102	66	f
7	7	[BELL]	39	27	'	71	47	G	103	67	g
8	8	[BACKSPACE]	40	28	(	72	48	H	104	68	h
9	9	[HORIZONTAL TAB]	41	29	)	73	49	I	105	69	i
10	A	[LINE FEED]	42	2A	*	74	4A	J	106	6A	j
11	B	[VERTICAL TAB]	43	2B	+	75	4B	K	107	6B	k
12	C	[FORM FEED]	44	2C	,	76	4C	L	108	6C	l
13	D	[CARRIAGE RETURN]	45	2D	-	77	4D	M	109	6D	m
14	E	[SHIFT OUT]	46	2E	.	78	4E	N	110	6E	n
15	F	[SHIFT IN]	47	2F	/	79	4F	O	111	6F	o
16	10	[DATA LINK ESCAPE]	48	30	0	80	50	P	112	70	p
17	11	[DEVICE CONTROL 1]	49	31	1	81	51	Q	113	71	q
18	12	[DEVICE CONTROL 2]	50	32	2	82	52	R	114	72	r
19	13	[DEVICE CONTROL 3]	51	33	3	83	53	S	115	73	s
20	14	[DEVICE CONTROL 4]	52	34	4	84	54	T	116	74	t
21	15	[NEGATIVE ACKNOWLEDGE]	53	35	5	85	55	U	117	75	u
22	16	[SYNCHRONOUS IDLE]	54	36	6	86	56	V	118	76	v
23	17	[ENG OF TRANS. BLOCK]	55	37	7	87	57	W	119	77	w
24	18	[CANCEL]	56	38	8	88	58	X	120	78	x
25	19	[END OF MEDIUM]	57	39	9	89	59	Y	121	79	y
26	1A	[SUBSTITUTE]	58	3A	:	90	5A	Z	122	7A	z
27	1B	[ESCAPE]	59	3B	;	91	5B	[	123	7B	{
28	1C	[FILE SEPARATOR]	60	3C	<	92	5C	\	124	7C	|
29	1D	[GROUP SEPARATOR]	61	3D	=	93	5D	]	125	7D	}
30	1E	[RECORD SEPARATOR]	62	3E	>	94	5E	^	126	7E	~
31	1F	[UNIT SEPARATOR]	63	3F	?	95	5F	_	127	7F	[DEL]

Metin Olusturma

Karakter	t	s	o	n	l	e	a

Metin Olusturma

Karakter	t	s	o	n	l	e	a
Huffman Kodu	00	010	0111	111	0110	10	110

Metin Olusturma

Karakter	t	s	o	n	l	e	a
Huffman Kodu	00	010	0111	111	0110	10	110
Bit Sayısı	2	3	4	3	4	2	3

Metin Olusturma

Karakter	t	s	o	n	l	e	a
Huffman Kodu	00	010	0111	111	0110	10	110
Bit Sayısı	2	3	4	3	4	2	3
Frekans	53	22	18	45	13	65	45

Metin Olusturma

Karakter	t	s	o	n	l	e	a
Huffman Kodu	00	010	0111	111	0110	10	110
Bit Sayısı	2	3	4	3	4	2	3
Frekans	53	22	18	45	13	65	45
Frekans * Bit Sayısı	106	66	72	135	52	130	135
Toplam				696			

Metin Olusturma

t	00
s	010
o	0111
n	111
l	0110
e	10
a	110

Sıkıstırılmıs dosyadaki bit sayısı

= kac_bit + hangi_karakterler + toplam_kod + sıkıstırılmıs_metin

= 3 + (7*8) + 21 + 696

= 776

Sıkıstırma oranı

= normal metin bit sayısı / kodlanmıs metin bit saıysı

= 2088 / 776

= 2.69

sıkıstırılmıs metin, gerçek metin %37'si kadardır.

100 / 2.69 = 37%

Metin Olusturma

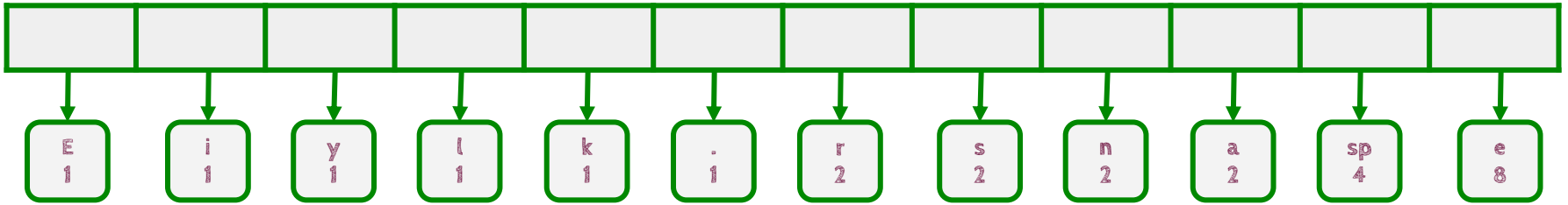
Karakter	a	b	c	d	e	f
Huffman Kodu	0	101	100	111	110	1100

Decode: 11000100110

11000100110 face

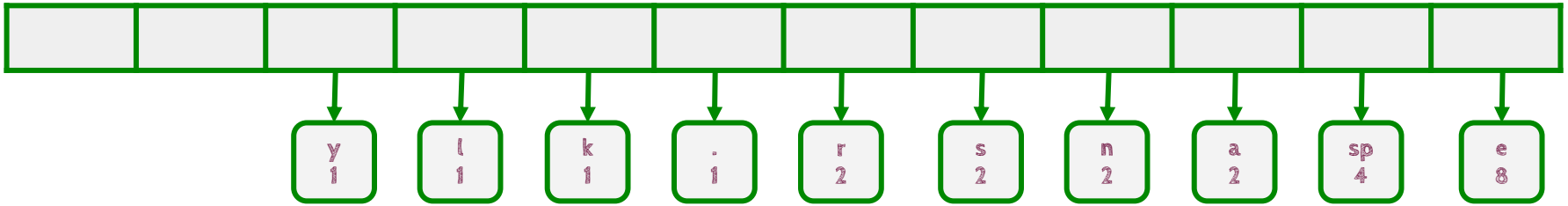
11000100110 eaace

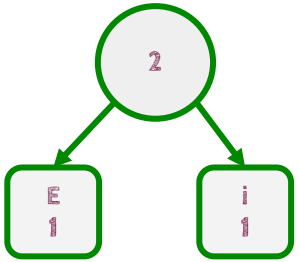
Statik Huffman Kodlama



"Eerie eyes seen near lake."

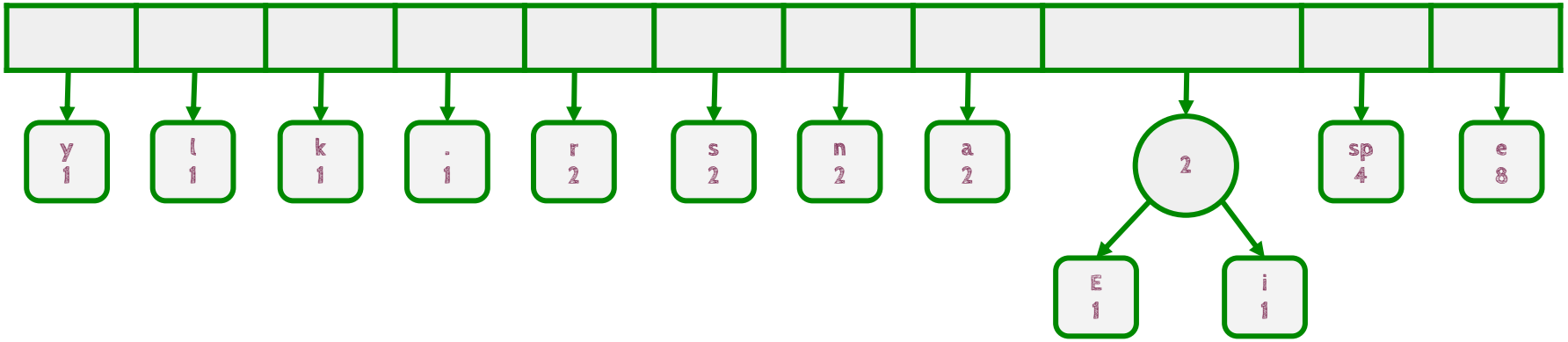
Statik Huffman Kodlama





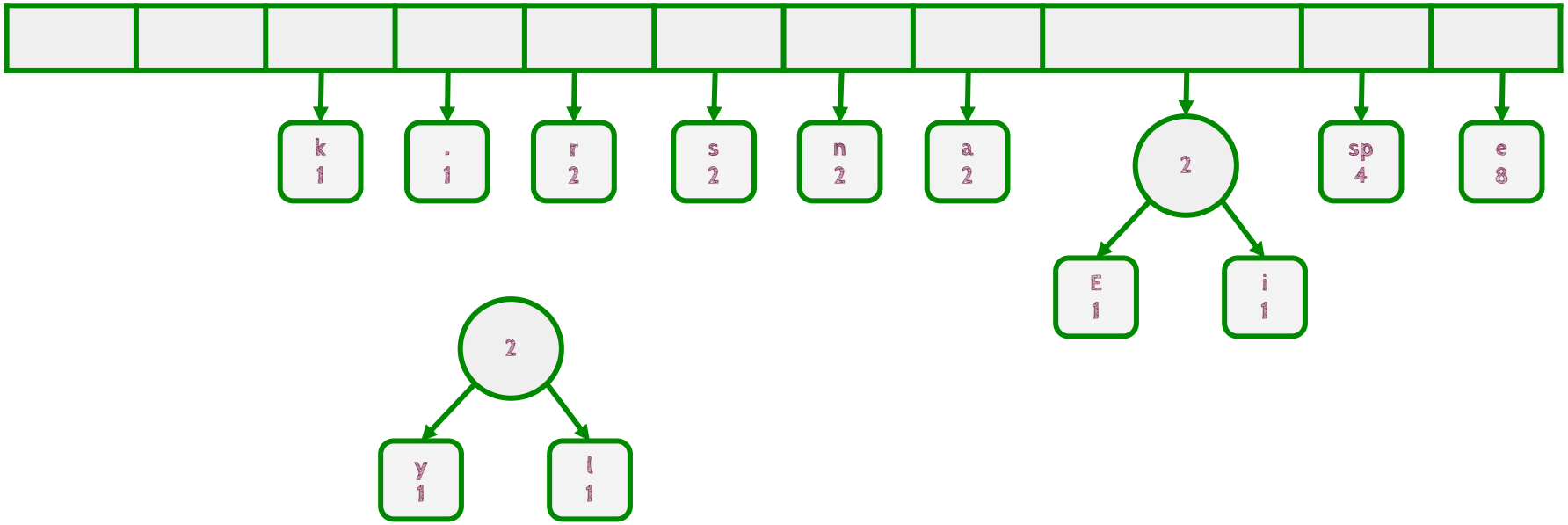
"Eerie eyes seen near lake."

Statik Huffman Kodlama



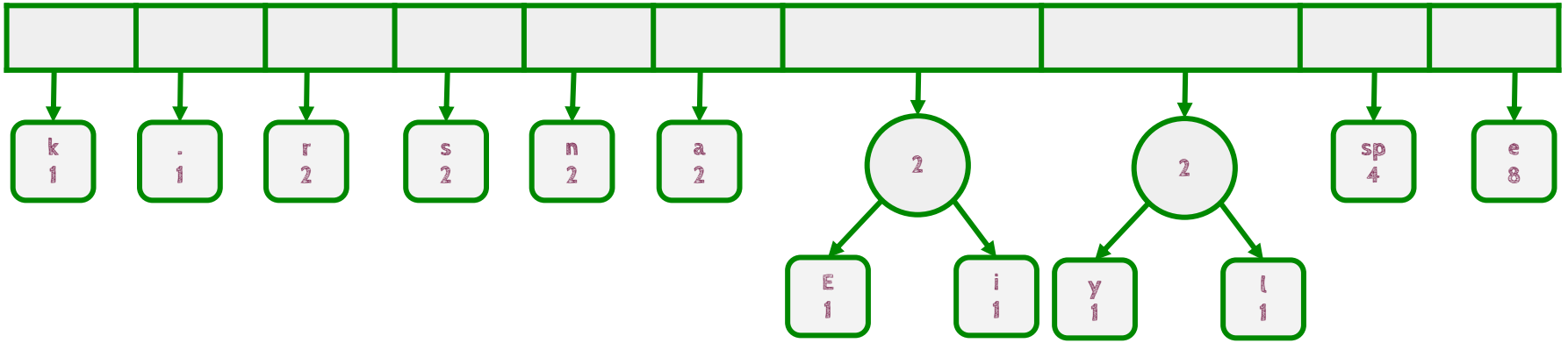
"Eerie eyes seen near lake."

Statik Huffman Kodlama



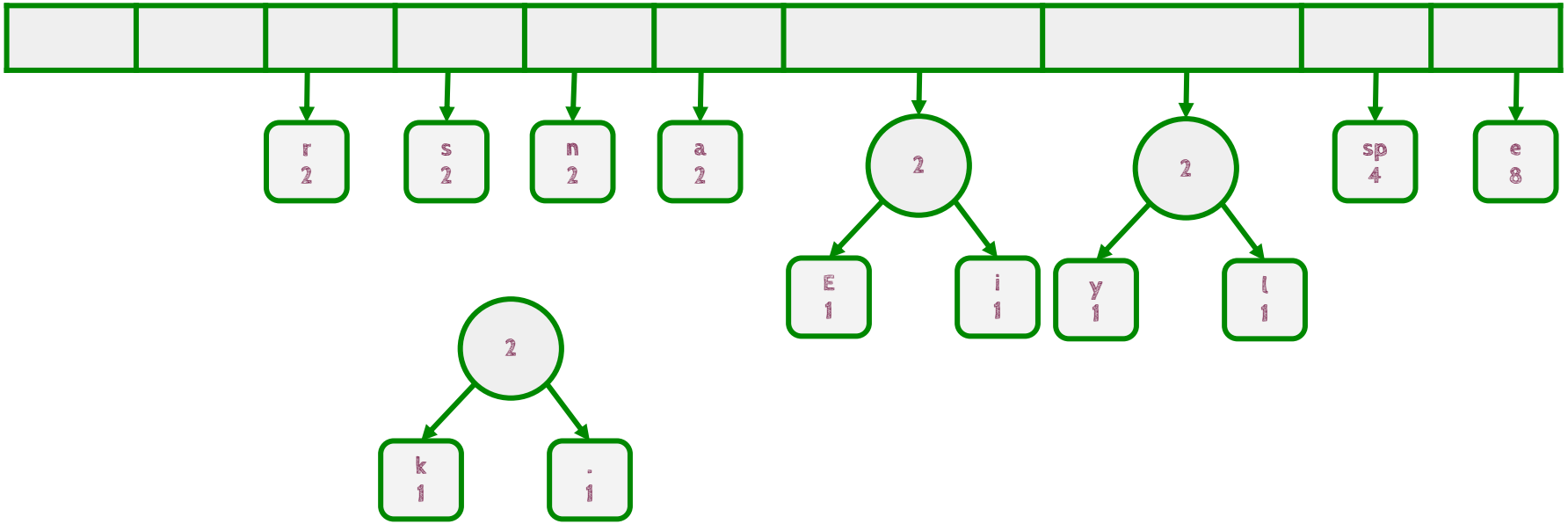
"Eerie eyes seen near lake."

Statik Huffman Kodlama



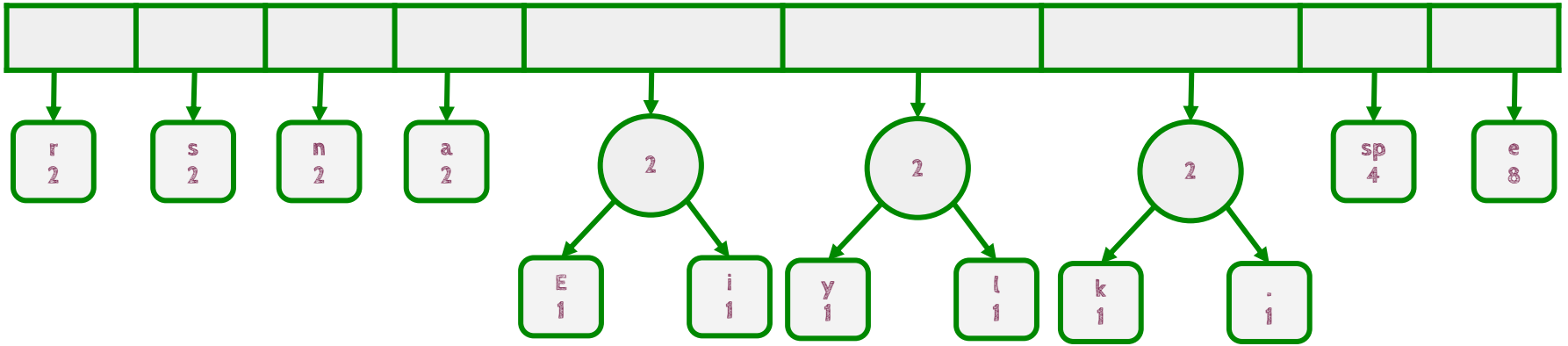
"Eerie eyes seen near lake."

Statik Huffman Kodlama



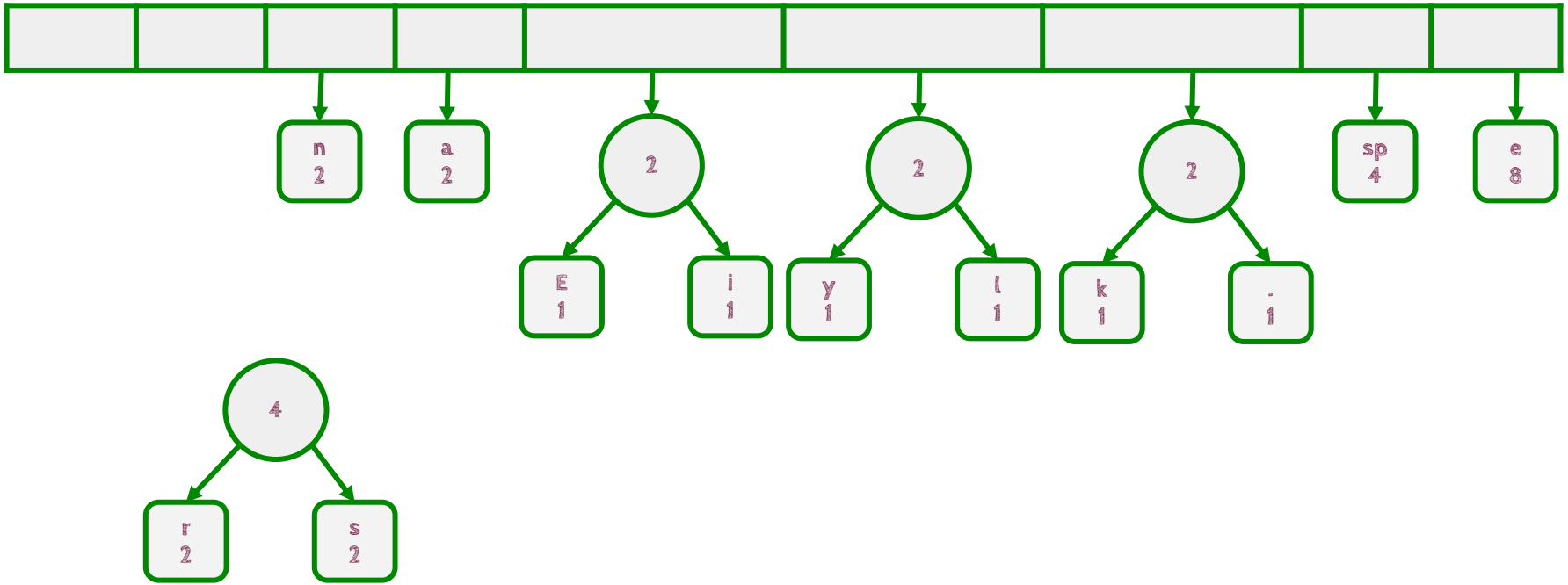
"Eerie eyes seen near lake."

Statik Huffman Kodlama



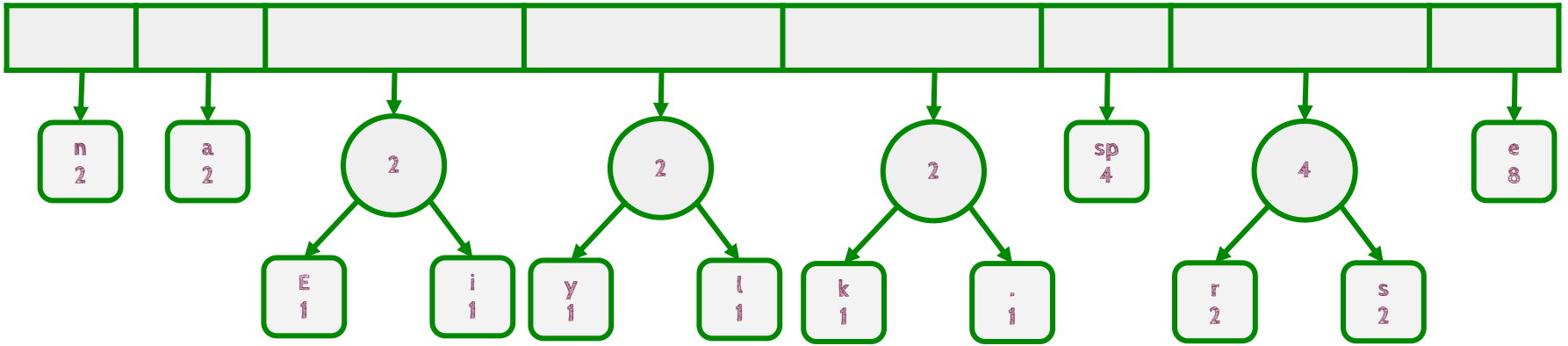
"Eerie eyes seen near lake."

Statik Huffman Kodlama



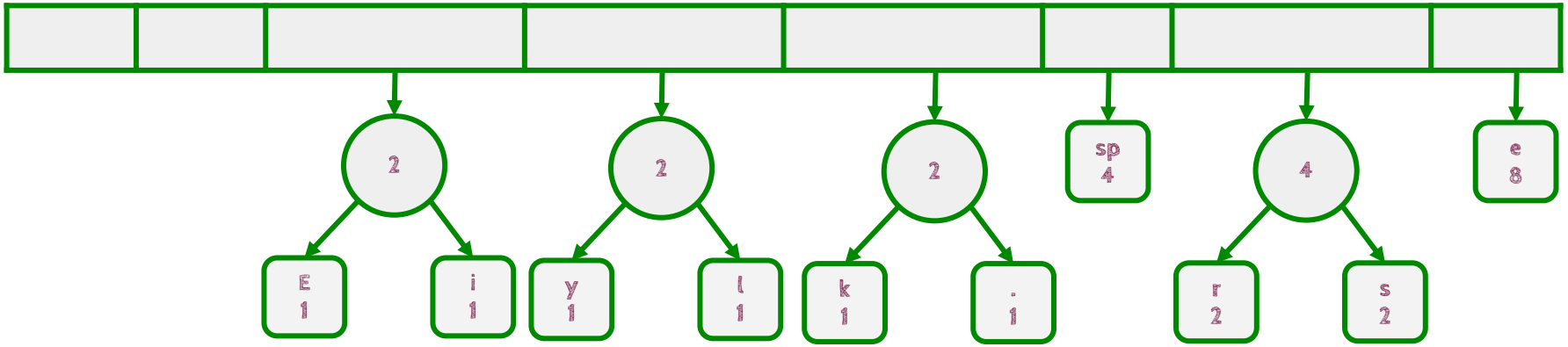
"Eerie eyes seen near lake."

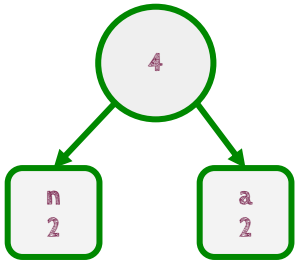
Statik Huffman Kodlama



"Eerie eyes seen near lake."

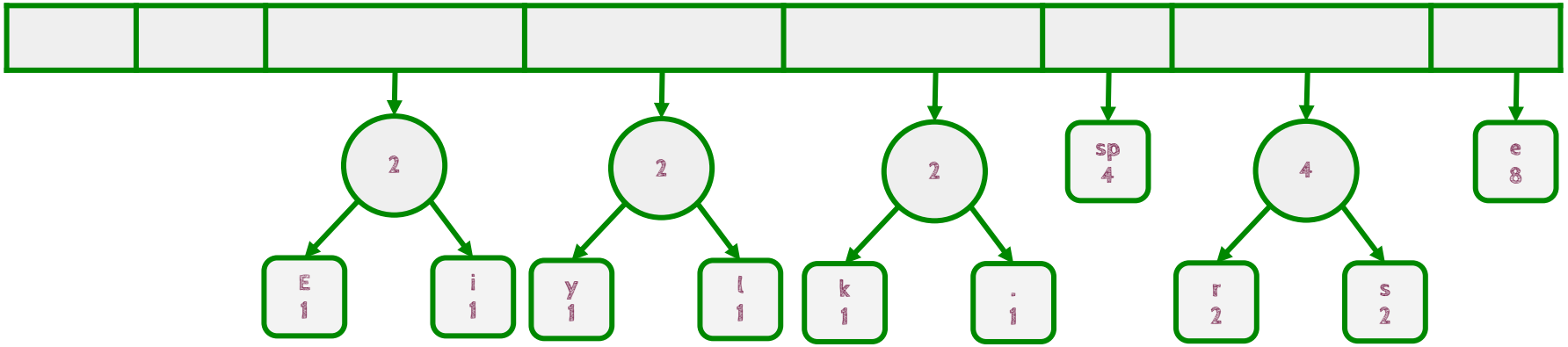
Statik Huffman Kodlama

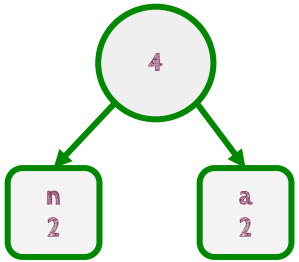




"Eerie eyes seen near lake."

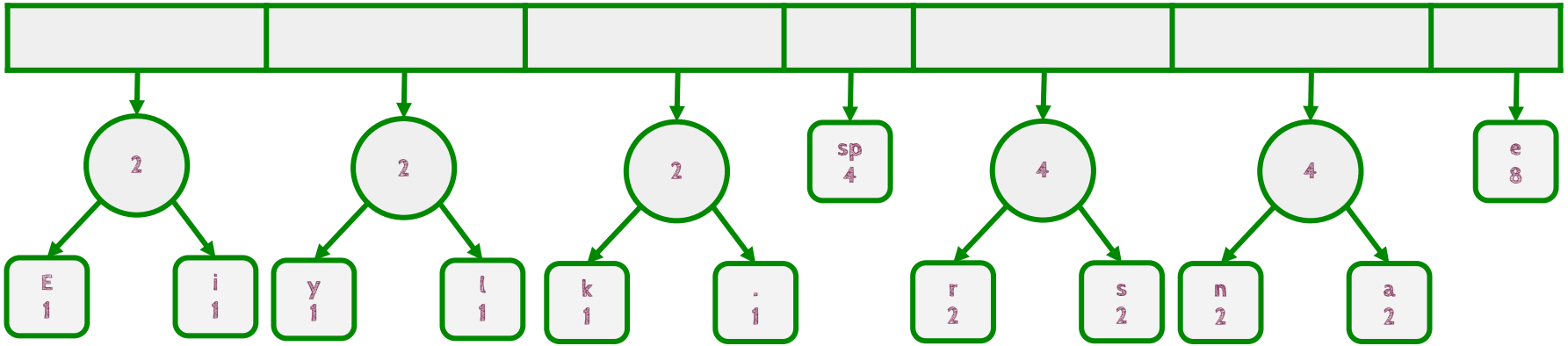
Statik Huffman Kodlama





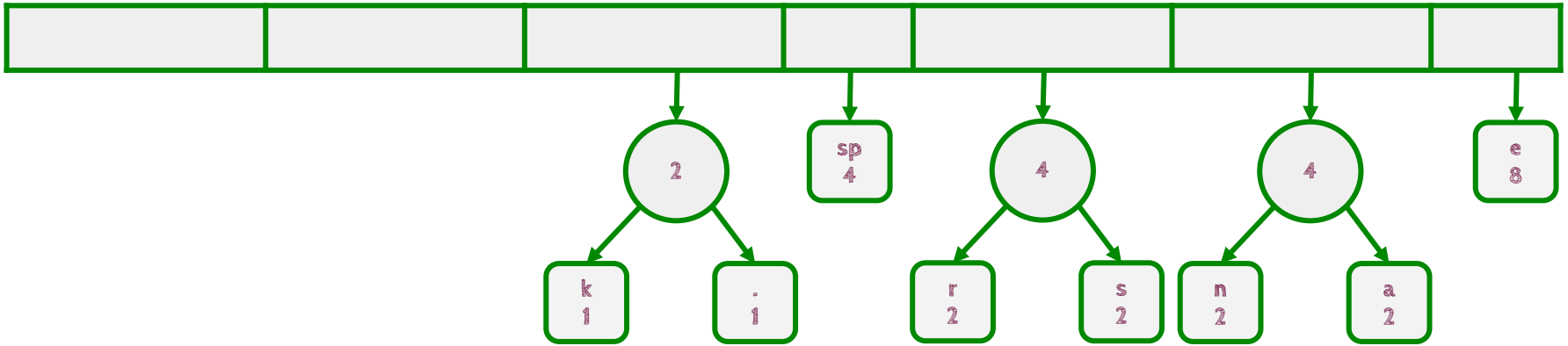
"Eerie eyes seen near lake."

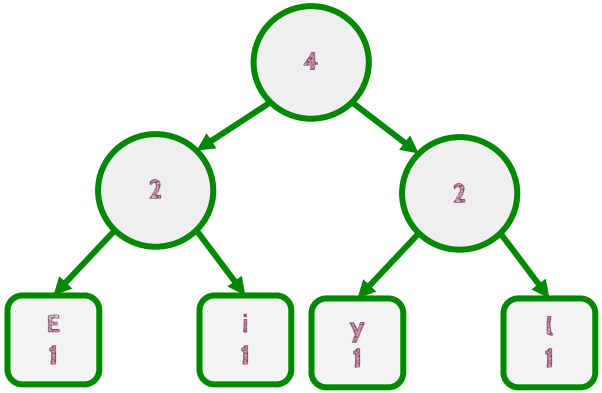
Statik Huffman Kodlama



“Eerie eyes seen near lake.”

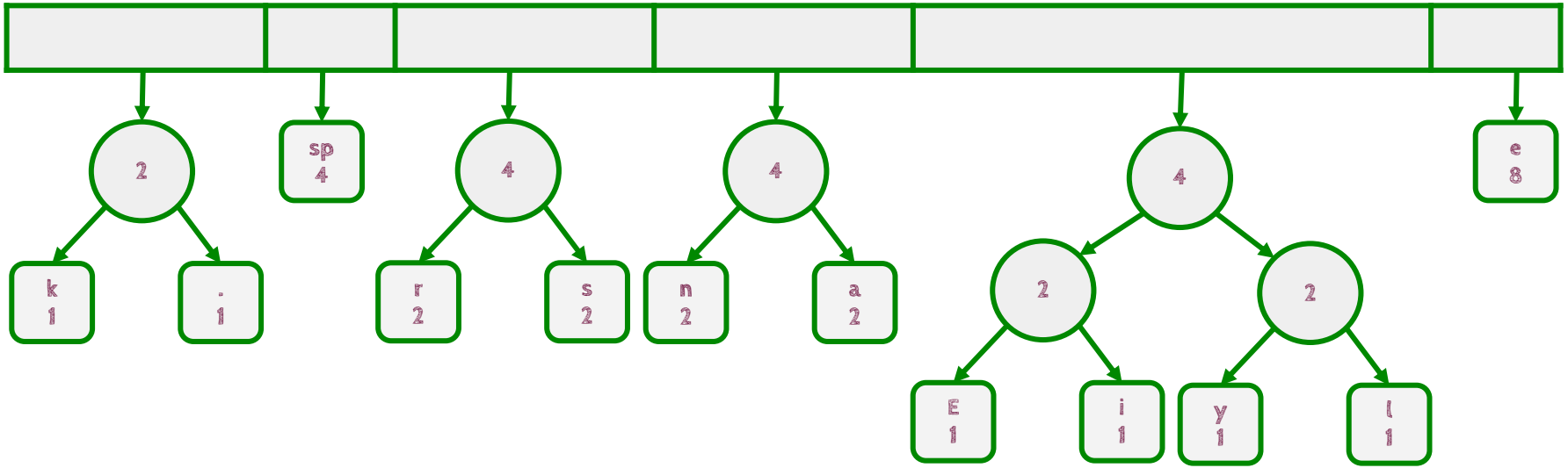
Statik Huffman Kodlama





"Eerie eyes seen near lake."

Statik Huffman Kodlama



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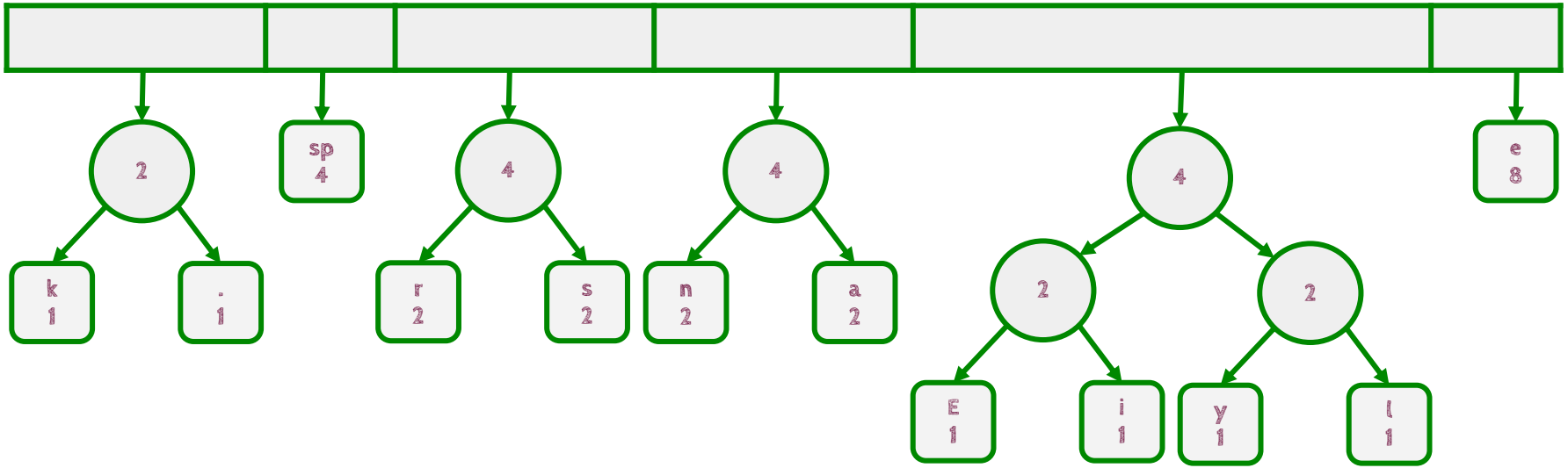

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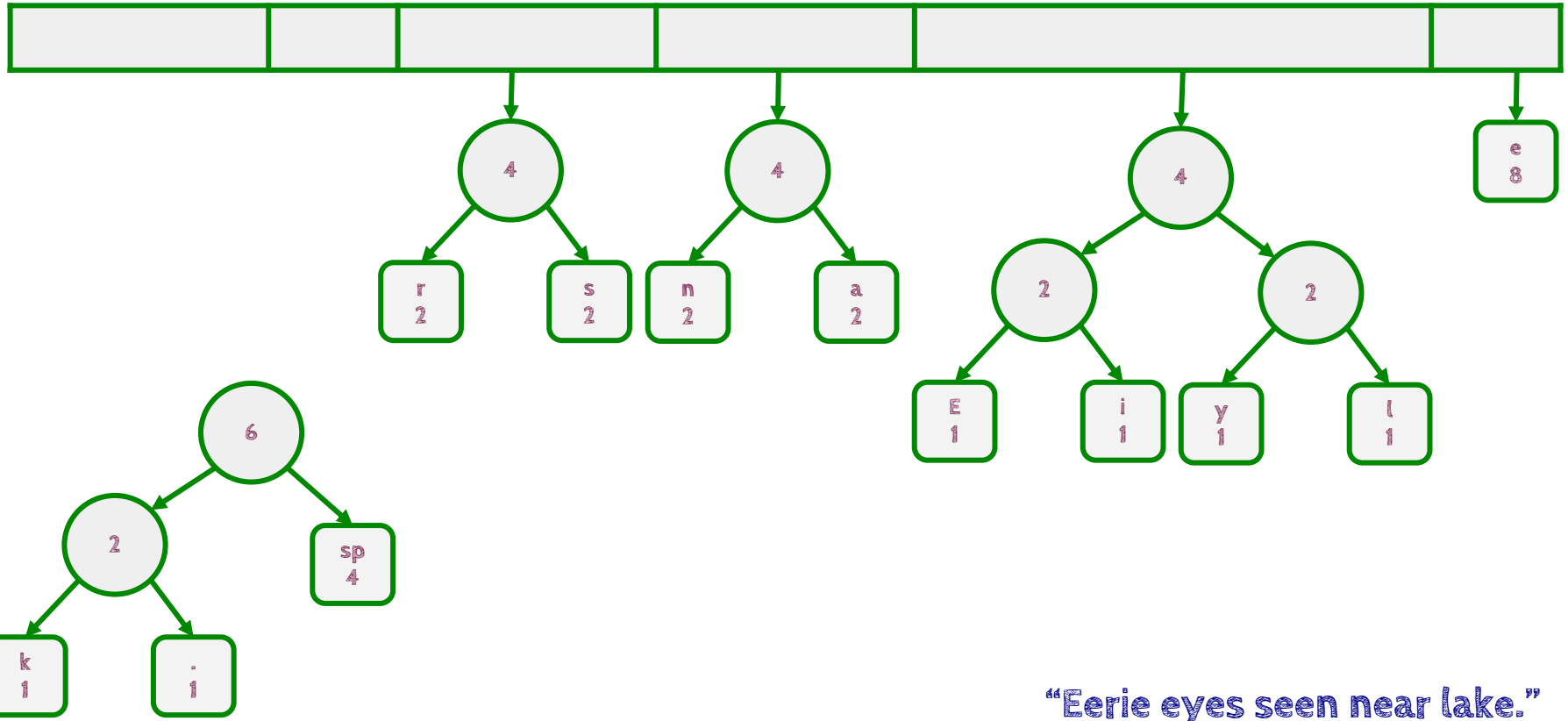

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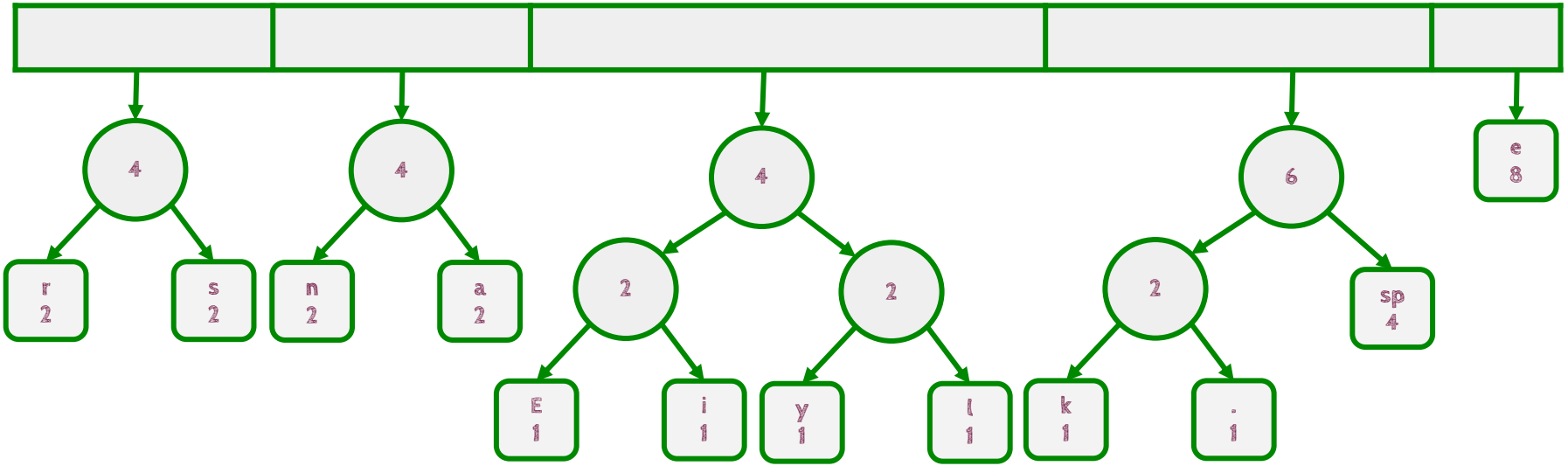

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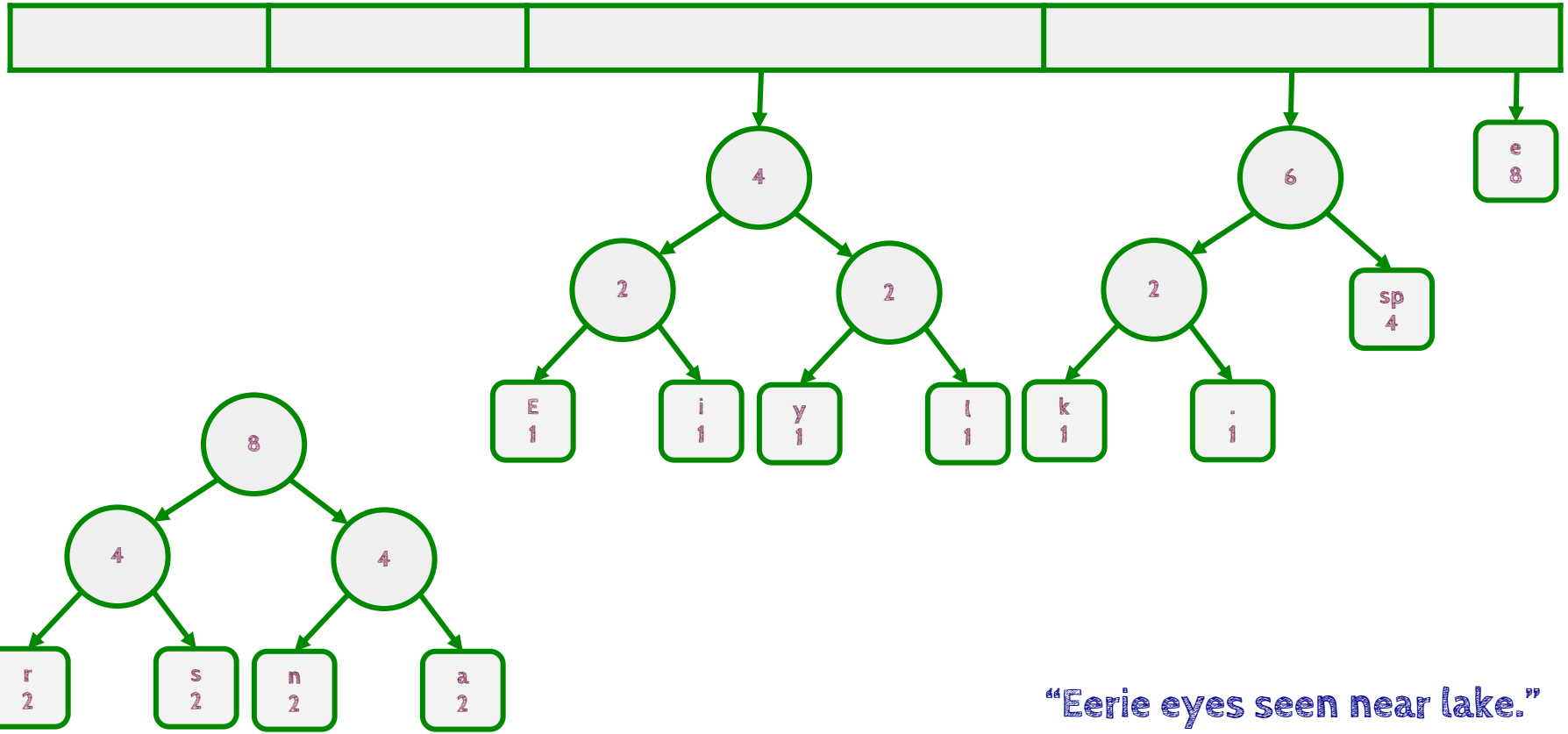

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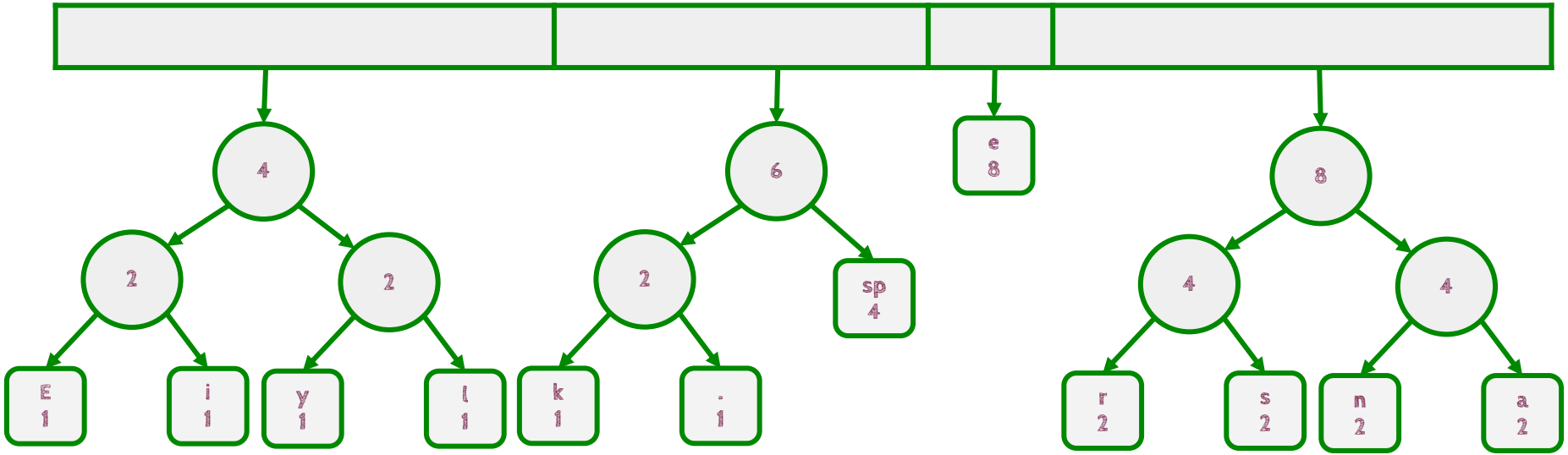

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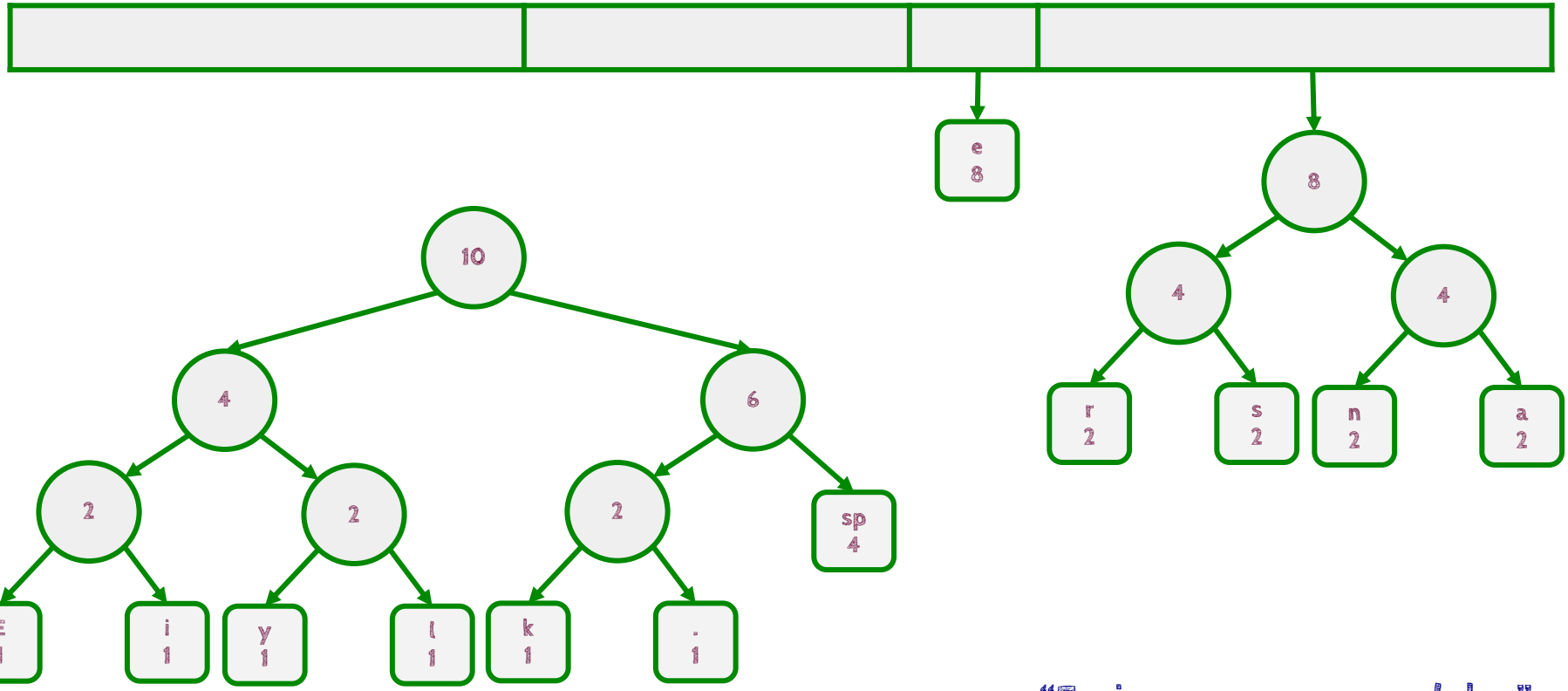

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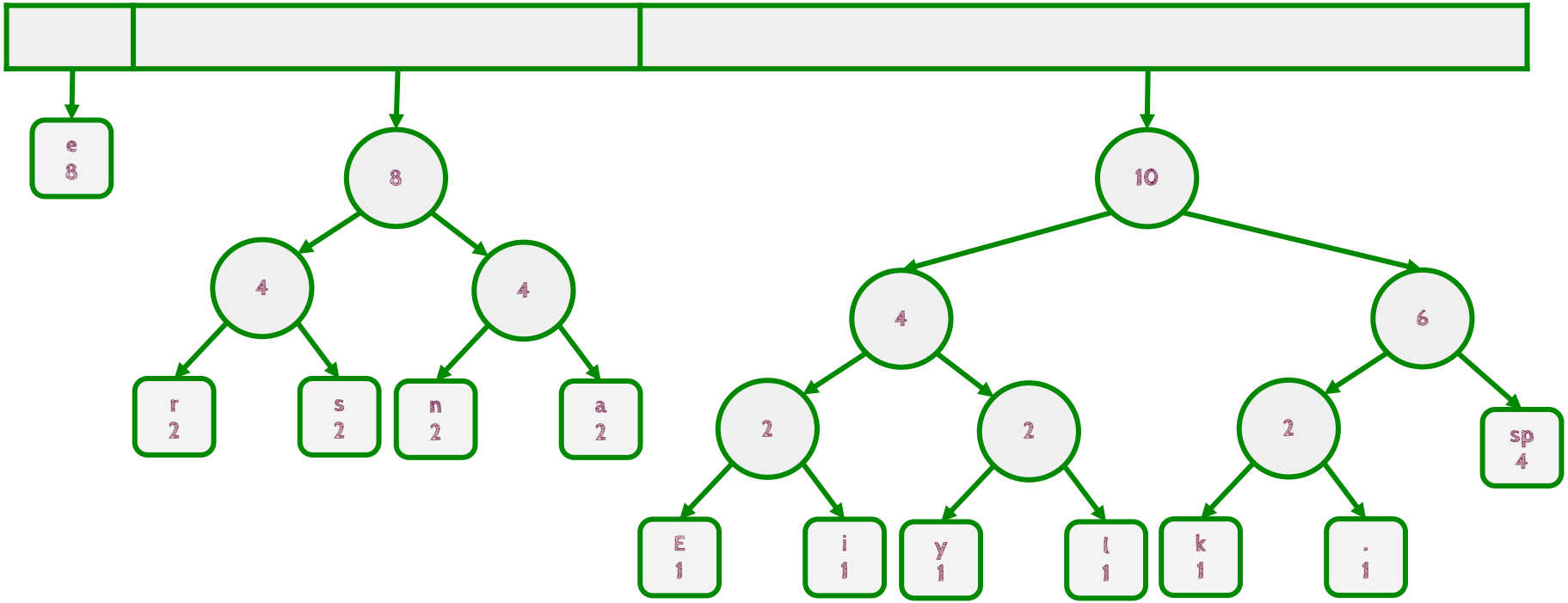

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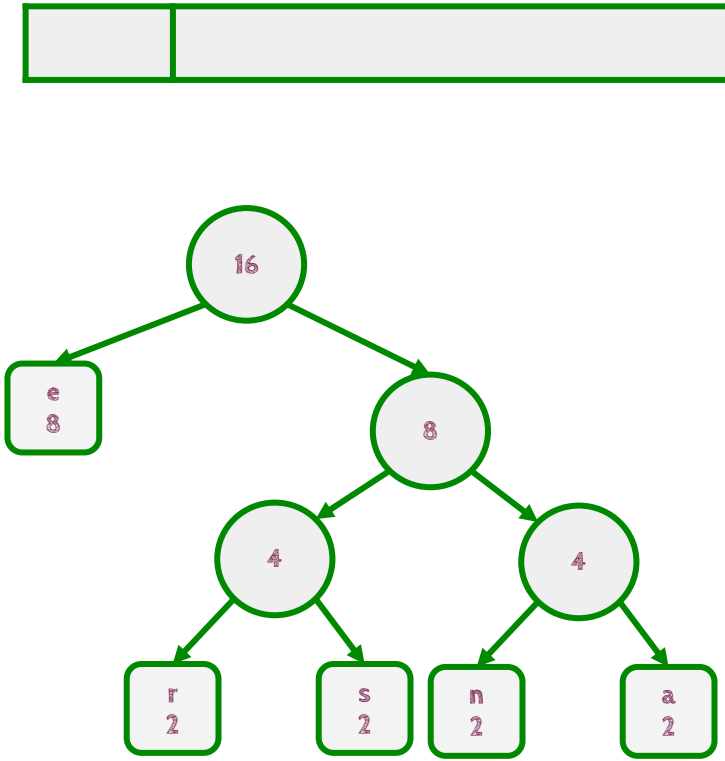

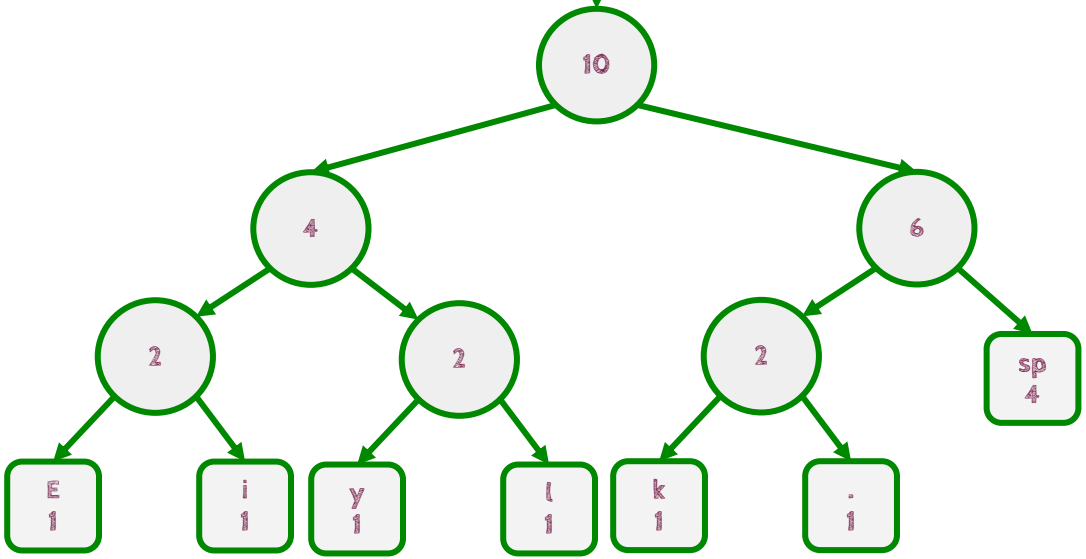

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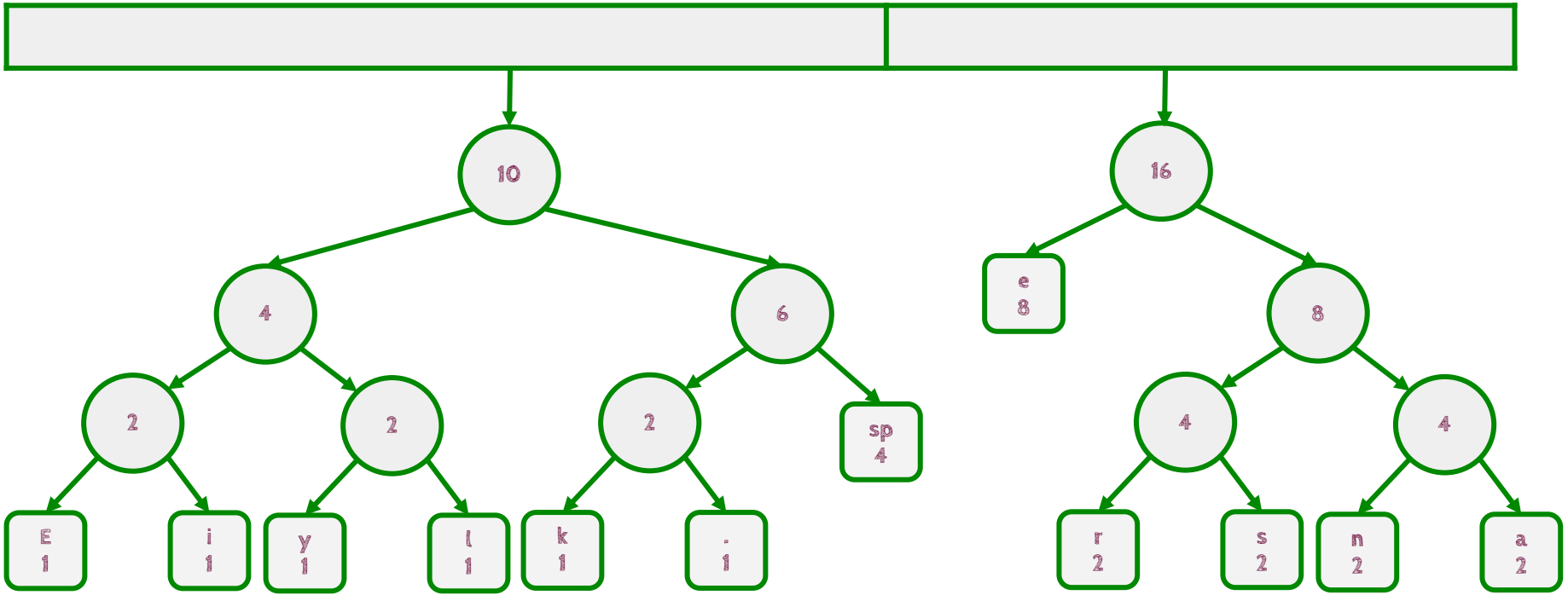

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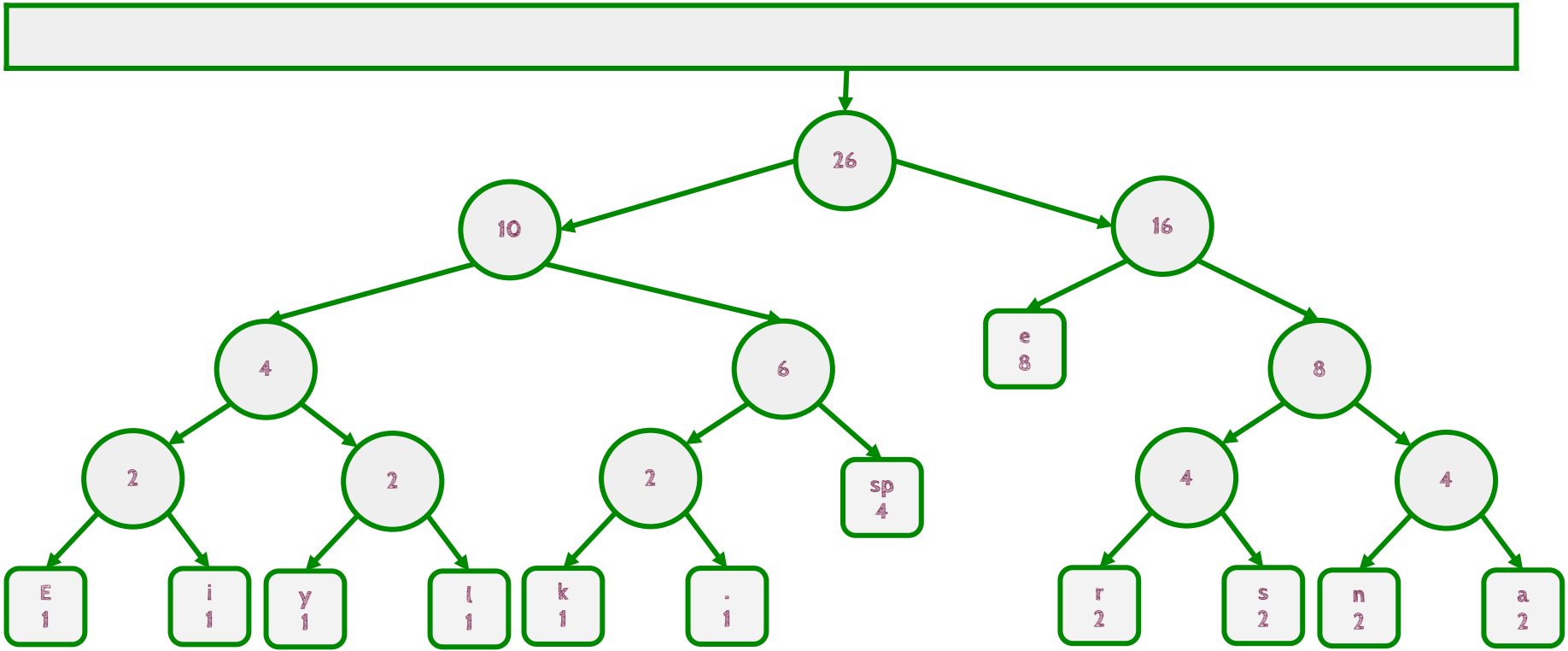

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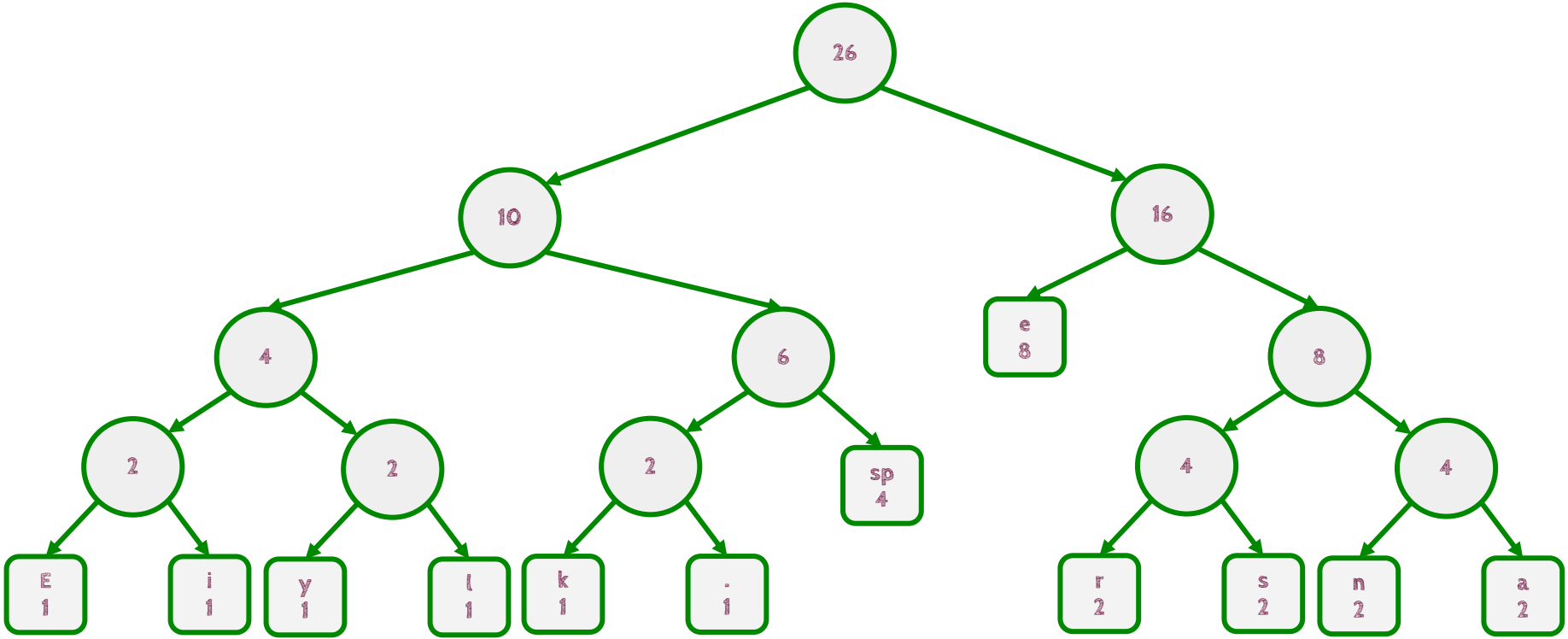

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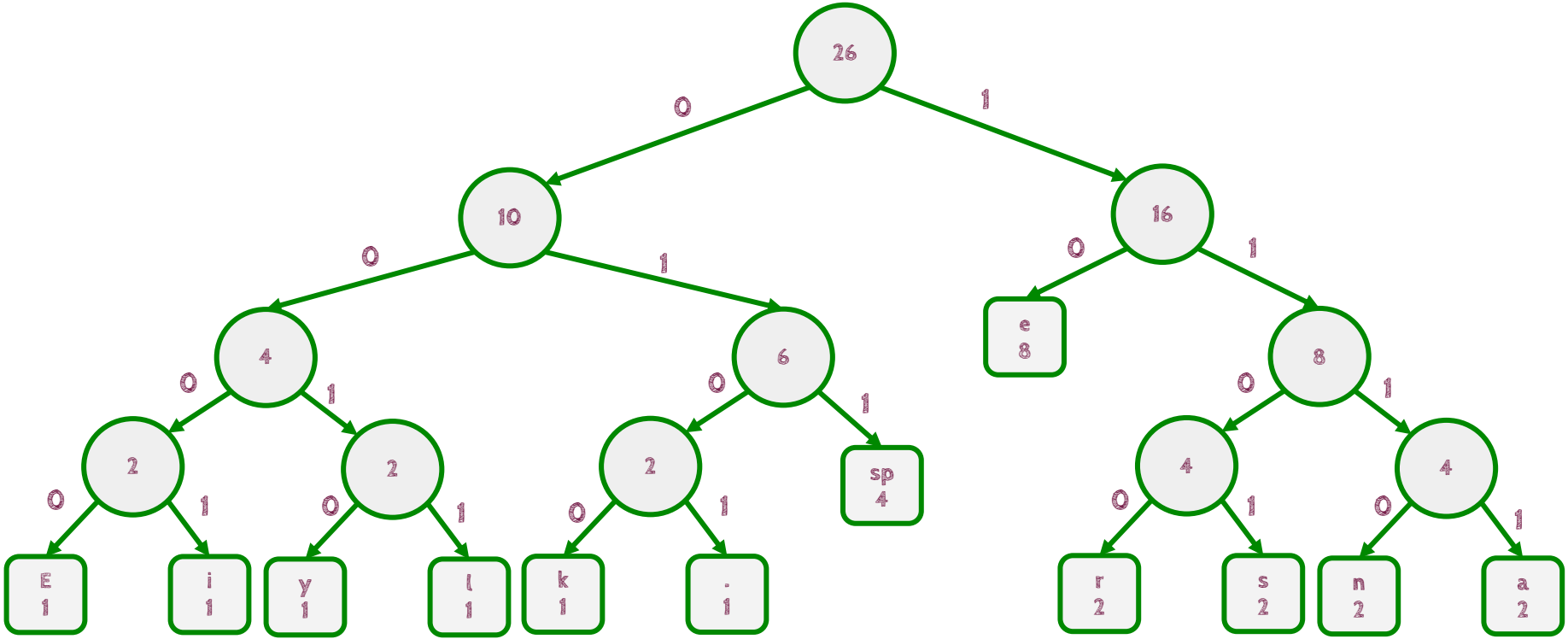

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Karakter	Kod
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y	0010
l	0011
k	0100
.	0101
space	011
e	10
r	1100
s	1101
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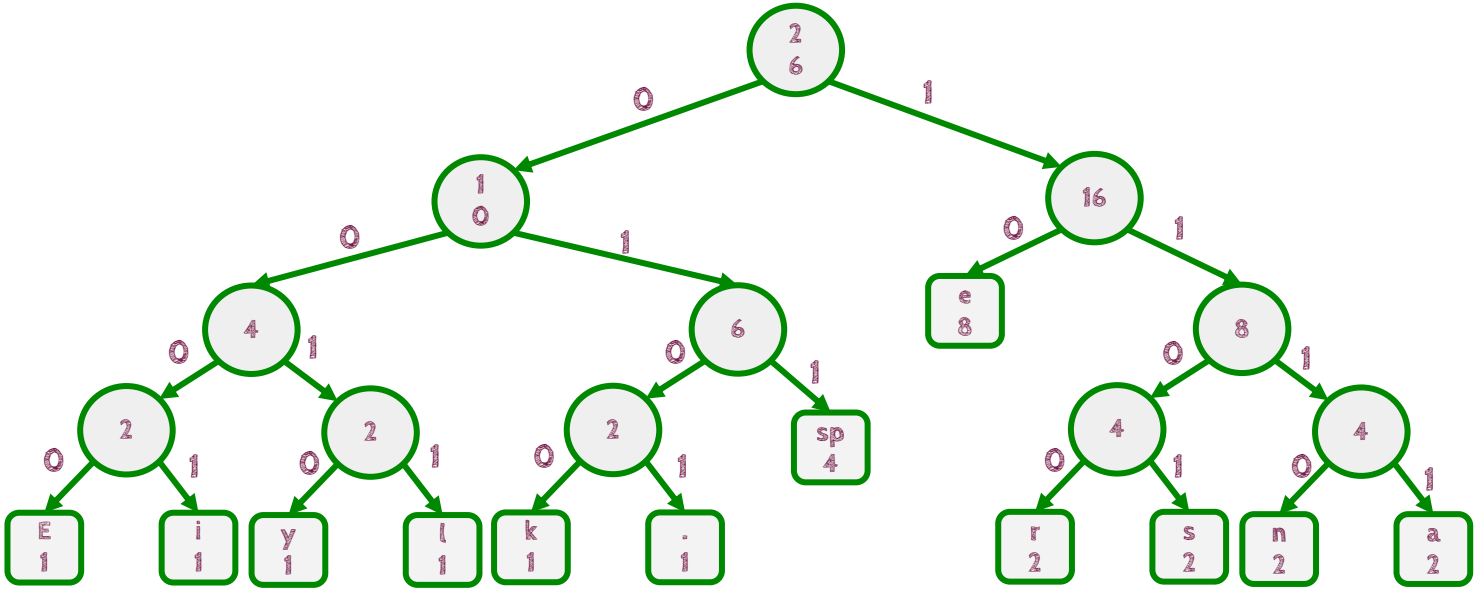
a	1111



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Karakter	Kod
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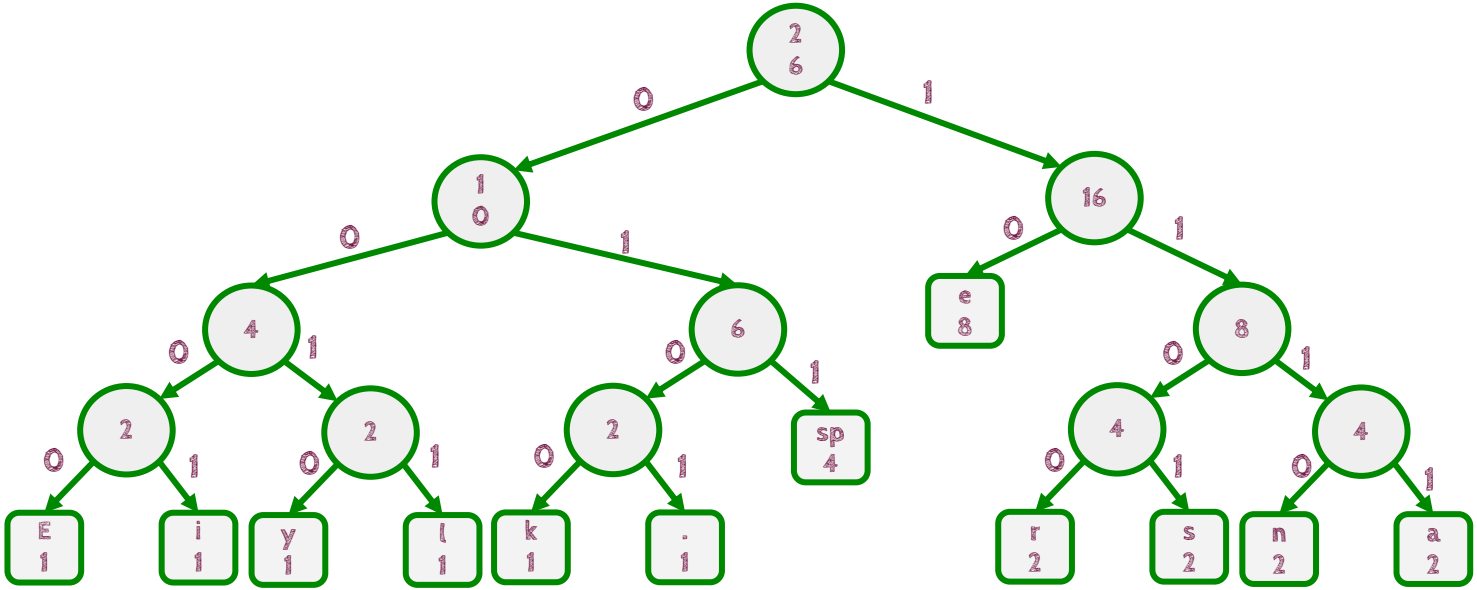

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