Q1

Question Three [20 marks]

A file contains only colons, spaces, newlines, commas, and digits in the following frequency: colon (100), space (605), newline (100), comma (705), 0 (431), 1 (242), 2 (176), 3 (59), 4 (185), 5 (250), 6 (174), 7 (199), 8 (205), 9 (217). Construct the Huffman code.

159

Ans:- 59, 100, 100, 174, 176, 185, 199,

259 242, 250, 431, 605, 705. 12

100 (159) 174, 176 185 199 ------

350

174, 176, 185 ---- 250 (259) 431 --

185 199 242 250 (259) (350) 431 --

384

242 250 (259) (350) (384) 431 ----

490 609

(259) (350) (384) 431 (490) 605 705

384 431 490 605 609 705

815

490 605 609 815 705

1095

609 815 705 1095

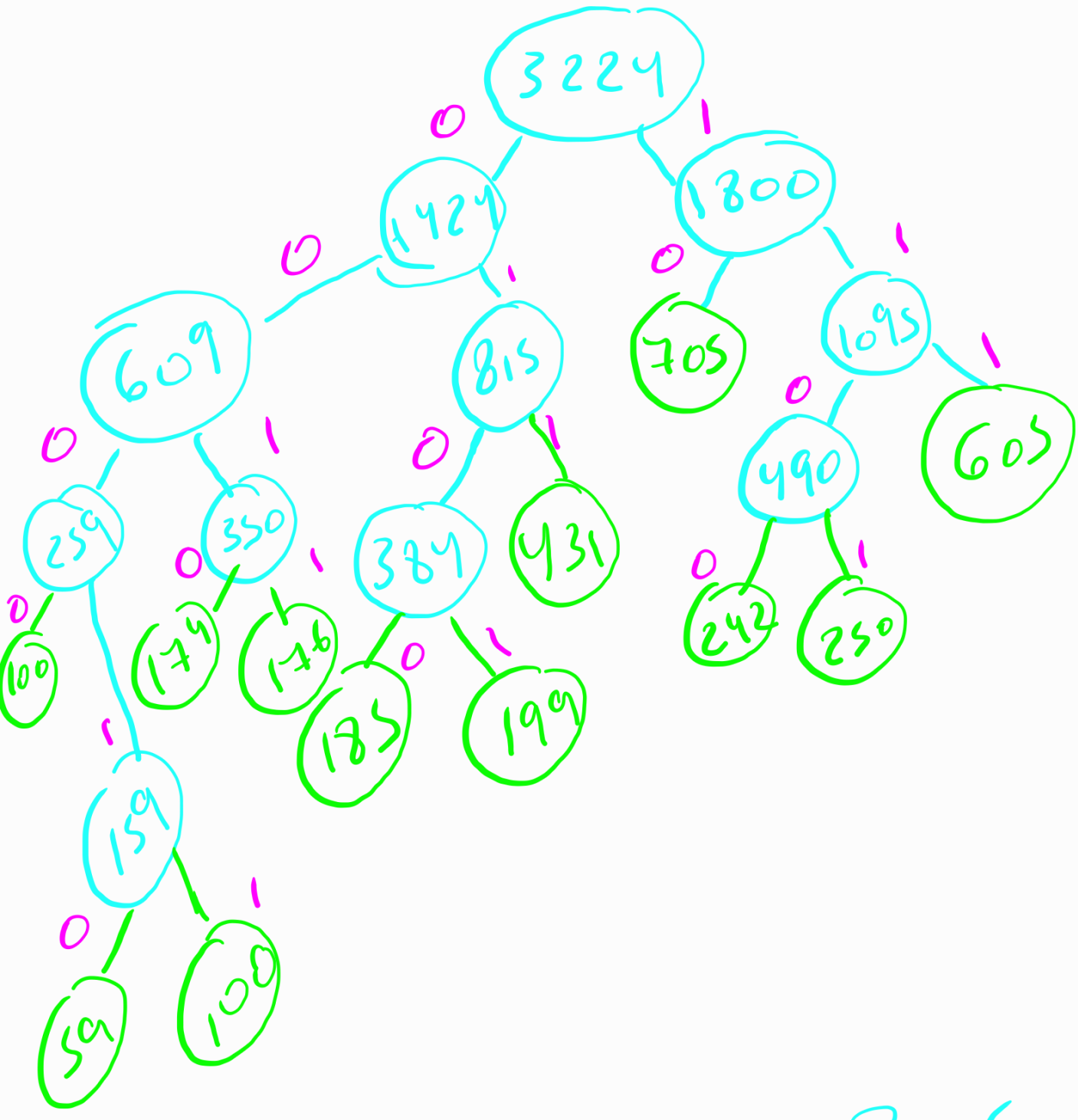
1424

705 1095 1424

1800

1424 1800

3224



12

205

217

missing.

(2) a: 30 b: 8 c: 22

d: 53 e: 17 f: 38

g: 12 h: 40 i: 15

9

1. total size in bits if we used ASCII?

Ans:- 235 x 8 = 1880

2. total size if we used fixed length?

Ans:- 235 x 3 = 705

3. huffman code for the given symbols:-

Ans:-

8, 12, 15, 17, 22, 30, 38, 40, 53

20

8, 12, 15 - -

32

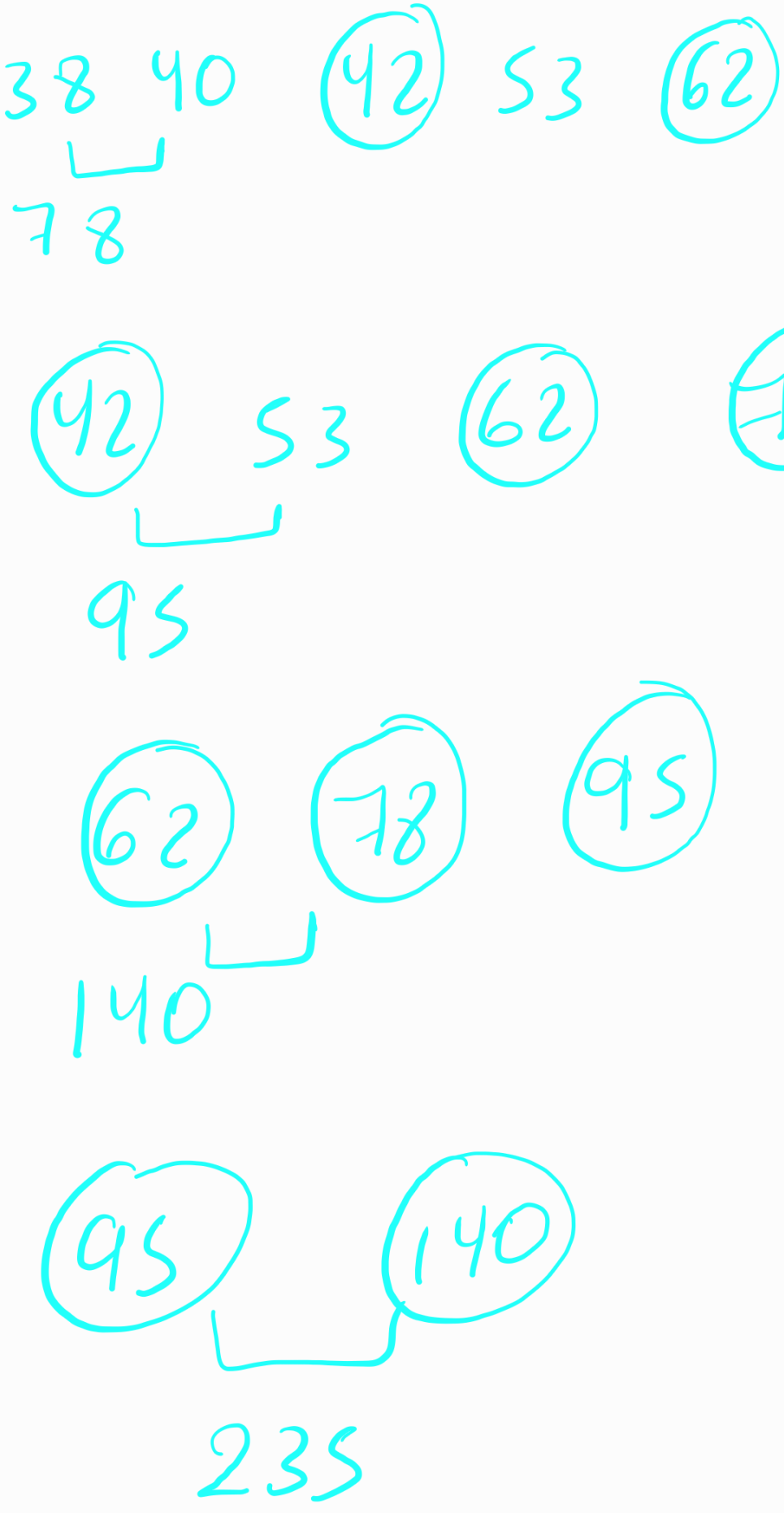
15 17 (20) 22 - - -

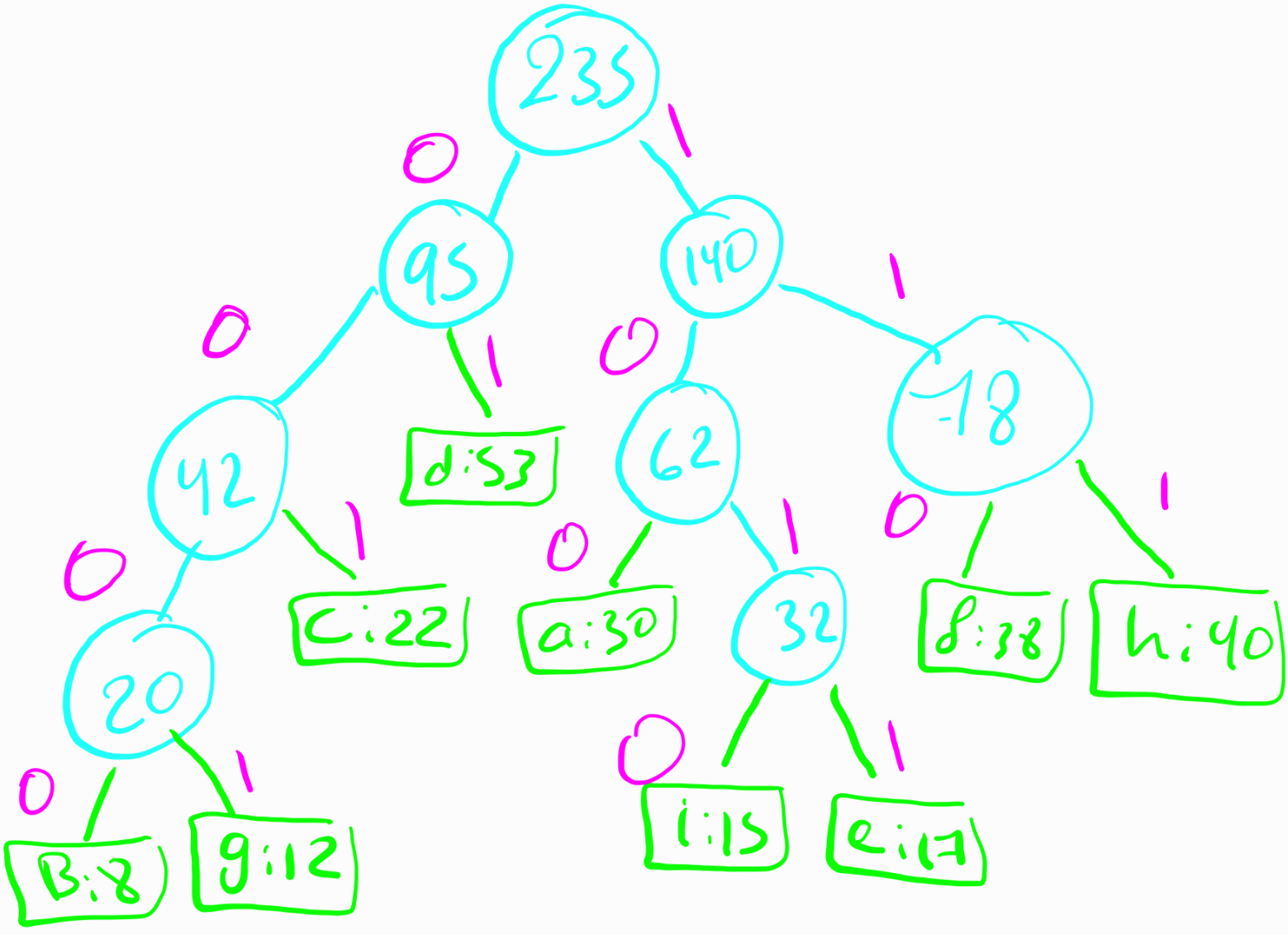
42

(20) 22 30 (32) 38 40 53

62

30 (32) 38 40 (42) 53





d:53:01

c:22:001

B:8:0000

a:30:100

i:15:1010

e:17:1011

f:38:110

h:40:111

g:12:0001

4. Total size if we used huffman:-

$(2 \times 53) + (3 \times 22) +$

$(4 \times 8) + (3 \times 30) +$

$(4 \times 15) + (4 \times 17) +$

$(3 \times 38) + (3 \times 40) +$

$(4 \times 12) = 704.$

(3) B : 2 : 01111

F : 1 : 01110

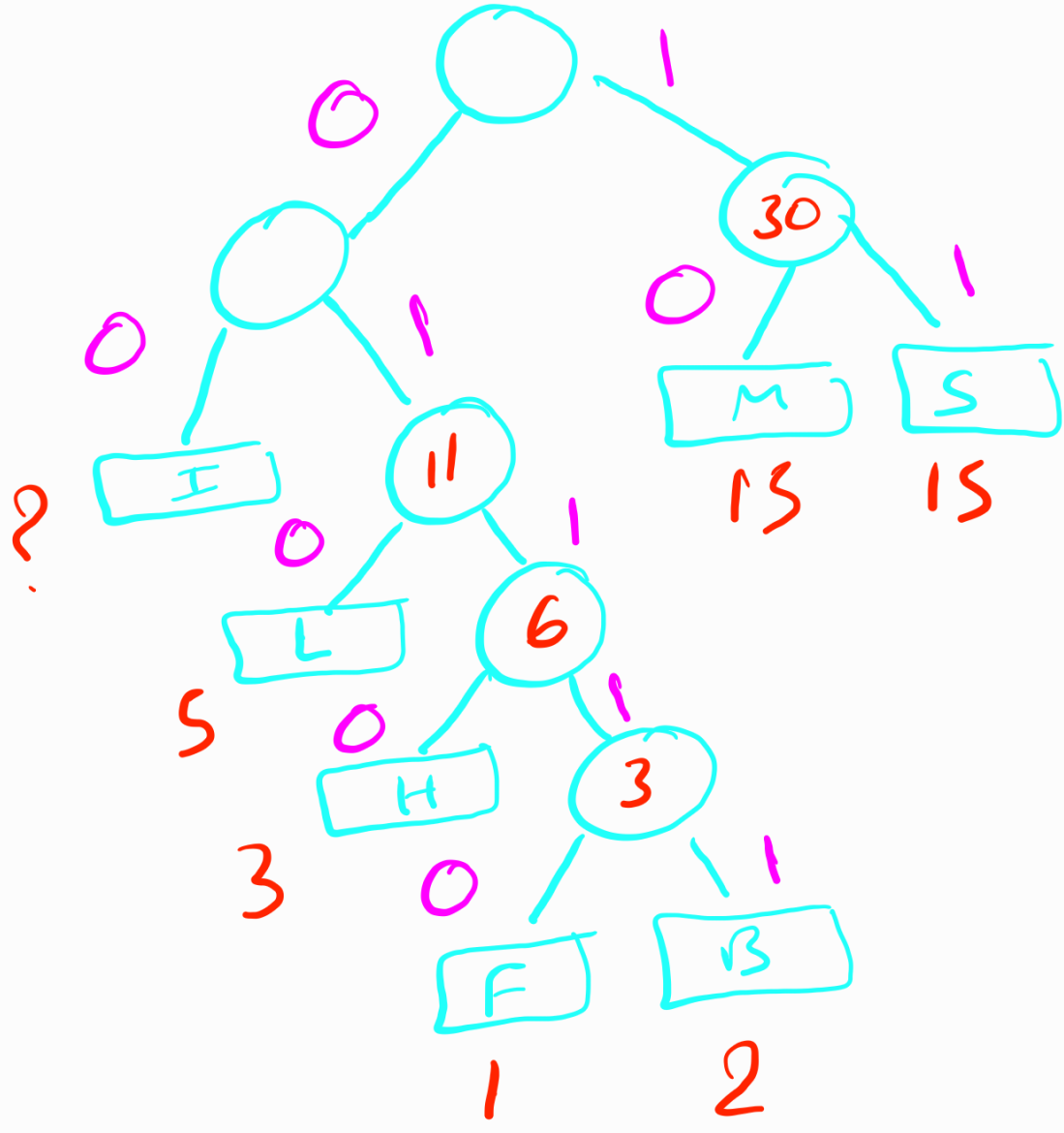
H : 3 : 0110

I : ?

L : 5 : 010

M : 15 : 10

S : 15 : 11



$5 < I < 11$