

**Part E [14 points]** N.B. 1 point for each underline in formulas.

The sheet depicted here implements a simple Huffman encoder.

The address of the cell in the top left corner is A1.

letter	code	input	position	character	Hcode	output
	000	<i>max. 20 characters</i>				
a	001					
c	01					
d	10					
e	110					
r	1110					
t	1111					

All ranges have been named using the obvious labels.

**letter** - the characters that can be coded

**code** - corresponding Huffman codes

In the following view, a user has entered **input**.

letter	code	input	position	character	Hcode	output
	000	<i>max. 20 characters</i>	1	c	01	01
a	001	cat	2	a	001	01001
c	01		3	t	1111	010011111
d	10					
e	110					
r	1110					
t	1111					

Note that cells that were empty now display contents:

**position** - the position in the **input**

**character** - the character in that **position**

**Hcode** - the Huffman code of that **character**

**output** - the output string to that point

1) Write a formula to calculate the second cell in the **position** column. [6]

=IF( F2< LEN (input)) ,F2+1 ,"" )

The columns **character**, **Hcode**, and **output** are all controlled by the same test.

=IF(ISNUMBER(position), value\_if\_true, value\_if\_false)

2) Write the *value\_if\_true* part for the second cell in the **Hcode** column.[4]

= LOOKUP( character, letter, code)

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3) A column in an Excel worksheet named **Letter Grade** contains the formula

=IF(Score<80,"B",IF(Score<70,"C",IF(Score<60,"D",IF(Score<50,"F","A"))))

What will appear in **Letter Grade** when **Score** is 88?

- A) A
- B) B
- C) C
- D) D
- E) F

4) Referring to the formula in the previous question, what will appear in **Letter Grade** when **Score** is 45?

- A) A
- B) B
- C) C
- D) D
- E) F

5) A company decides to give some of its employees a holiday bonus. Those who have been employed at the company for at least 10 years get a bonus if their performance is considered either *good* or *excellent*. Those who have not been employed at the company that long get a bonus only if their performance is considered *excellent*. Assume the columns are named as shown.

Years	Rating	Bonus
3	excellent	YES
15	poor	NO
12	acceptable	NO
2	good	NO
10	good	YES

Which formula could have been used to calculate the values in the **Bonus** column.

- A) =IF(Rating="good" AND IF (Years>=10," YES ", " NO"))
- B) =IF(OR(AND(Years<10, Rating="good"),Rating="excellent"),"YES","NO")
- C) =IF(Years>=10 AND (Rating>="good"),"Yes","No")
- D) =IF(Rating>="good",IF(Years>=10,"YES", "NO"),"NO")
- E) =IF(OR(AND(Years>=10, Rating="good"),Rating="excellent"),"YES","NO")

6) Which of the following is not a function category in Excel?

- A) Date & Time
- B) Information
- C) Math & Trig
- D) Random
- E) Text