UNIT 17 *Huffman Codes* Teacher Resource Material

Key Stage: *3 or 4*

Target: *Mainstream Year 9; coursework for GCSE*

This is a really important topic, relevant to modern-day internet application for the efficient transmission of files. Essentially the method illustrated here is a simplified version of the complex package used to compress files for transmission.

Solutions and Notes

Exercise 1 $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^7 = 128$

Exercise 2 a) MAN ATE TEA

b) MEET TEAM AT TEN

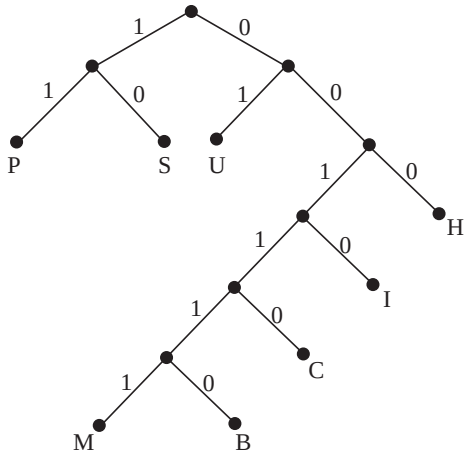
Activity 1 Two other possibilities exist – these are shown on **OS 17.2**. The first one is efficient if 3 of the 5 letters all have a higher (and similar) frequency than the other two. The second is applicable when just one letter has a much higher frequency than the other four which have similar frequencies.

Activity 2 a) **OS 17.3** gives four possible solutions to this problem but there are many more possibilities. How many?

b) The letter frequency is given in the table:

Letter	*Frequency*	
B	1	001110
C	2	00110
H	4	000
I	3	0010
M	1	001111
P	10	11
S	11	10
U	8	01

As three of these letters have a much higher frequency than the others, the best solution is given by (d) on **OS 17.3**; namely



and hence the code as shown in the table above.