## Exercises: Breaking Enigma

1. Here is some Enigma ciphertext from near the end of a message.

$$\cdots$$
 A E H J L K P Y K H E S R A Y  $\cdots$ 

(a) Sometimes, Enigma messages ended with the phrase 'HEIL HITLER'.

Can you find where this phrase fits in the ciphertext?

$$\begin{array}{c} 1 \; 2 \; 3 \; 4 \; 5 \; 6 \; 7 \; 8 \; 9 \; 10 \\ \cdots \; A \; E \; H \; J \; L \; K \; P \; Y \; K \; H \; E \; S \; R \; A \; Y \; \cdots \\ & \; H \; E \; I \; L \; H \; I \; T \; L \; E \; R \end{array}$$

(b) Draw a menu to be used the Bombe Machine.

$$P \xrightarrow{3} I \xrightarrow{6} H \xrightarrow{5} K \xrightarrow{2} E \xrightarrow{7} T$$

$$Y \xrightarrow{4} L \xrightarrow{8} S$$

(c) Is this a good menu for breaking Enigma?

This is a not a good menu because it doesn't contain any loops, so is more likely to result in false stops.