Part 1: Reflective report

Dead ends(Things that didn`t workout):

To solve this puzzle, I first considered the problem of **transmitting a single bit using only two honks.** In this case, the best strategy would be to use one honk to signal a "Yes" and two honks to signal a "No". This way, the receiver can determine the correct answer with a 50% chance of guessing correctly if they don't hear any honks. **So, this is a very low success rate I got.**

Next, I considered the problem of **transmitting multiple bits using this one-bit encoding.** One approach would be simply transmitting each bit individually, using the one-bit encoding described above. However, **this would result in a very low success rate**, since the receiver could only guess the correct answer to each question with a 50% chance.

Another approach would be to use a more sophisticated error-correcting code, such as a **Hamming code or a Reed-Solomon code**. These codes are designed to maximize the minimum Hamming distance between any two valid codewords, which means that they can correct errors in the encoded message without requiring the receiver to know the original message. **However, these codes typically require longer codewords, which means that they may not be suitable for our problem** since we only have time to send 10 bits.

Some other method which I tried but not worked out are:

- Arithmetic coding
- Run-length encoding

Solution:

For the solution I implemented fusion of **Huffman coding** (which is generally used for compressing data to minimise its size while retaining all of its information) and **lossy compression of binary bits.**

I took first 5 bits as it is and encode it with huffman coding. Then on other end I tried to decode that 5 bits and this way I am able to produce 5 correct answers.

For the next 15 bits I have used **divide and conquer method to part the whole problem into small sections** . so I took 3 bits and encode it to 1 bit. That 1 bit convertsinto which binary number has the highest occurrence among the 3 bits.

Example :

Original bits	Encoding	Decoding	Right answers
000	0	000	3/3
001	0	000	2/3
010	0	000	2/3
100	0	000	2/3
011	1	111	2/3
110	1	111	2/3
101	1	111	2/3
111	1	111	3/3

So, If we take the worst case of this 3 bits arrangement **out of 15 bit we can get easily 10 right yes/no answers**.

So this is how I come up with my final solution which is

10 bit + 5 bit = **15bit.**