Let the binary representation of \( a \) be \( a_m \ldots a_1 a_0 \). Prove that the function

\[
\text{BinaryRep}(m) = \langle a_m, \ldots, a_0 \rangle
\]

is primitive recursive.

2. Define FromBinaryRep so that for all \( a \) and all \( b = \langle \ldots, 2, a_m, \ldots, a_0 \rangle \), we have FromBinaryRep\((b) = a \). Prove that FromBinaryRep is primitive recursive.

3. Prove that a set \( X \) is recursively enumerable if and only if \( X \) is the domain of a partial recursive function.

4. Prove that a set \( X \) is recursively enumerable if and only if \( X \) is the range of a partial recursive function.

5. Let \( H_2 = \{ e : \{ e \}(0) \} \). Prove that \( H_2 \) is not recursive. [As discussed in class, this is an example of a set that is recursively enumerable, but not recursive.]