Strength reduction is a compiler optimization that replaces computationally "expensive" instructions with similar code sequences that can be executed more cheaply. The canonical example of strength reduction is the transformation that replaces multiplications with additions.

```
zeraCol(int* m, int N, int C, int W) {
  int i, j;
  for (i = 0; i < N; i++) {
    j = C + i * W;
    m[j] = 0;
  }
}
```

Figure 1: Program that writes zero on each cell of a column of matrix m. Notice that the matrix is represented in linearized format, like an array of N*W cells.

1. Can you rewrite the program above, to remove the multiplication i*w from the loop?

```
zeraDig(int* m, int N, int C) {
  int i, j;
  for (i = 0; i < N; i++) {
    j = i * C + i;
    m[j] = 0;
  }
}
```

Figure 2: Program that zeros the diagonal of a linearized matrix.

2. What about this new program: could you remove the multiplication from the loop? How would the resulting code look like?

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