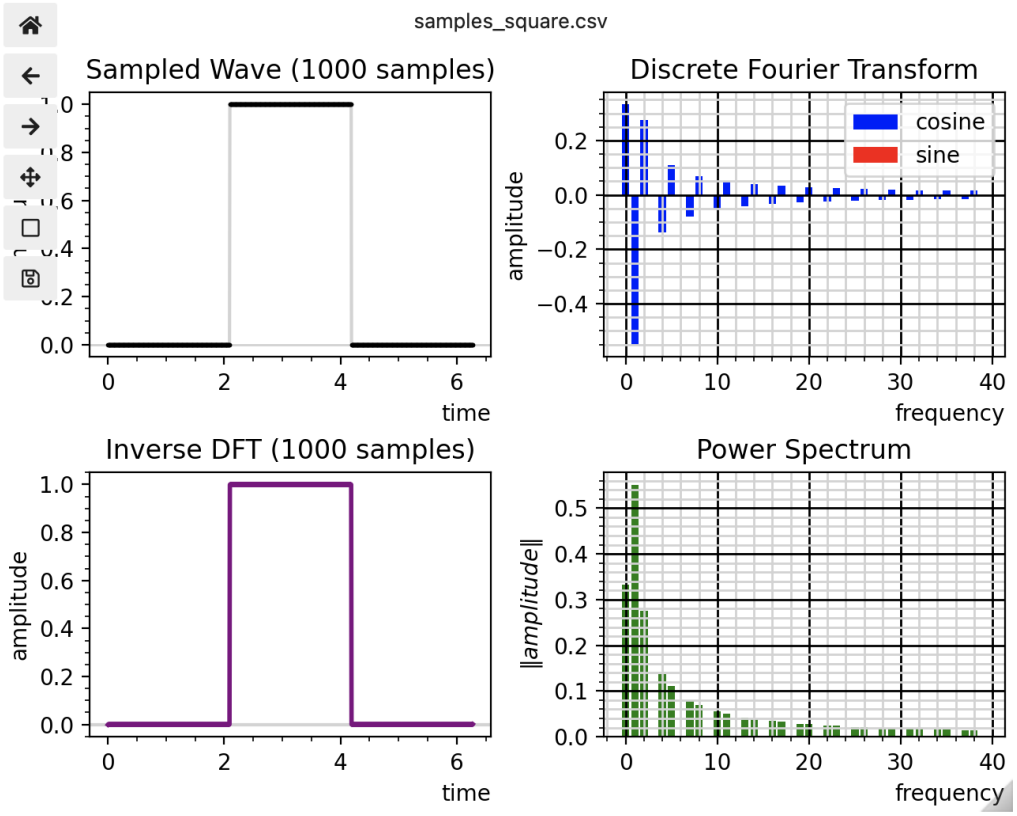

1.
2. Since the function we're evaluating only contains the cosine terms, there is no phase shifted (sine) term to damp or amplify the cosine function. Knowing this, it makes sense that the power spectrum will display infinite frequencies.
3. The DC component can be defined as the area that our given function covers over a span of time divided by period of the wave. The magnitude of the DC component reading ½ would mean that the period is twice as long as the area covered. More specifically, the area covered ~2 so the period is ~4.
4. The function commonly used to evaluate the DFT is an even function so upon evaluating the integral all of the sine terms become zero.