0.08, 0.18, 0.23, 0.36, 0.42, 0.55, 0.63, 0.72, 0.89, 0.91, the sequence has one run, an up run. It is not likely a random sequence.

Step 3: + + + + + + + + +   a =1, N=10

If *a* is the total number of runs in a truly random sequence, the mean and variance of *a* is given by

$$\mu_a = \frac{2N-1}{3}$$

and

$$\sigma^2 = \frac{16N-29}{90}$$

- For $N > 20$, the distribution of *a* is reasonably approximated by a normal distribution, $N(\mu_a, \sigma_a^2$. Converting it to a standardized normal distribution by

$$Z_0 = \frac{a-\mu_a}{\sigma_a}$$

that is

$$Z_0 = \frac{a-[(2N-1)/3]}{\sqrt{(16N-29)/90}}$$

- Failure to reject the hypothesis of independence occurs when $-z_{\alpha/2} \leq Z_0 \leq z_{\alpha/2}$, where the α is the level of significance.

$Z_{\alpha/2} = Z_{0.025} =$ -1.96__+1.96

Z_0= -4.38 rejected

-1.96<= - 4.38 <=1.96