Read more form <https://engineering.purdue.edu/~sudhoff/ee630/Lecture03.pdf> (enclosed) about Schema theory and solve the following problems:

1. Consider three strings A1=11101111, A2= 00010100, A3= 01000011 and six schemata H1=1\*\*\*\*\*\*\*, H2=0\*\*\*\*\*\*\*, H3= \*\*\*\*\*\*11, H4= \*\*\*0\*01\*, H5= 1\*\*\*\*\*1\*, and

H6=1\*\*\*\*\*1\*.

Which schemata is matched by which string? What are the order and defining length of each of the schemata? Estimate the probability of survival of each schema under mutation when the probability of a single mutation is pm=0.001. Estimate the probability of survival of each schema under crossover when the probability of crossover pc=0.85.

1. A population contains the following strings and fitness values at generation 0:

# String Fitness

1. 10001 20
2. 11100 10
3. 00011 5
4. 01110 15

The probability of mutation is pm=0.01 and the probability of crossover is pc=0.7. Calculate the expected number of schemata of the form 1\*\*\*\* in generation 1. Estimate the expected number of schemata of the form0\*\*1\* in generation 1.