

Q1:

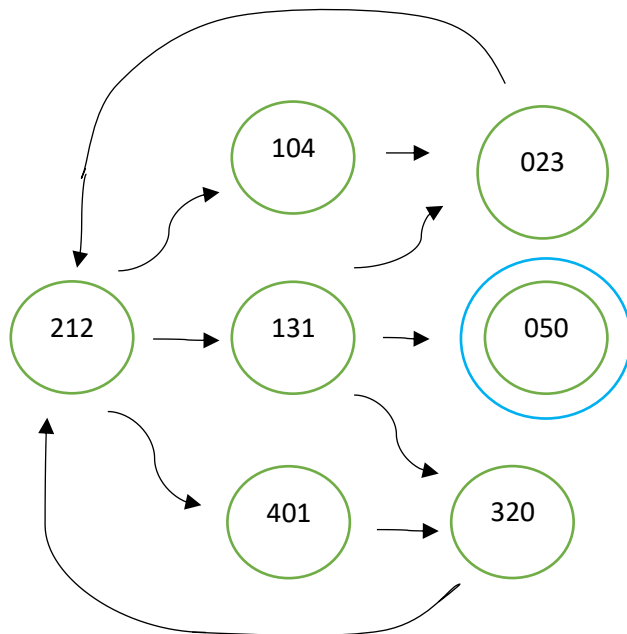
Give 5 elements from each of the following sets:

1- $\{xyzx \mid x, y, z \in \{0; 1; 2\}\} \Rightarrow 0120, 1201, 1021, 2012, 2102$

2- $\{yxzz \mid x, y, z \in \{0; 1\}\} \Rightarrow 0000, 0011, 0111, 1100, 1111$

Q2:

From the extended example that we did in the lecture of “Strange Planet”, assume that we have 5 individuals, start from the following state and continue to generate all other states.



Q3: What is the smallest language? Justify (prove) your answer.

the smallest language is a single element subset
alphabet = $\{0, 1\}$, $\{1\}$ can be a language

Q4: Give five examples of different alphabets

ascii, unicode, binary, {a,b,c....z}, arabic alphabet

Q5: Assume you have this alphabet $\Sigma = \{a, 1, z\}$ generate the strings in the following sets

$\Sigma^1 \Rightarrow \{a, 1, z\}$

$\Sigma^2 \Rightarrow \{a1, az, aa, 1z, 1a, 11, za, z1, zz\}$

$\Sigma^3 \Rightarrow \{ a1z, az1, aaa, aa1, aaz, azz, a11, aza, a1a, \\ 1az, 1za, 111, 11a, 11z, 1zz, 1aa, 1z1, 1a1, \\ za1, z1a, zzz, zza, zz1, z11, zaa, z1z, zaz \}$

Q6: Assume you have this alphabet $\Sigma = \{0, 1\}$ give five examples of different languages that can be generated from this alphabet (define the languages by words). Give three strings from each language.

1. set of strings starting with 1 $\Rightarrow \{ 1, 110, 1000 \}$
2. set of strings length = 2 $\Rightarrow \{ 01, 11, 00 \}$
3. set of strings starting with 1 and ending with 1 $\Rightarrow \{ 11, 111, 1001 \}$
4. set of strings with 0 and 1 at the same time $\Rightarrow \{ 001, 1011, 10 \}$
5. set of strings where the sum of numbers is 3 $\Rightarrow \{ 111, 11001, 00010101 \}$