1. The fecundity rates in the top row are self-explanatory: the age group 0-9 doesn’t reproduce so has a reproduction rate of 0. The age group 10-19 has an unusually high reproduction rate, perhaps implying the society in question is not in the First World, since those populations reproduce at later ages. The age group 20-29 and 30-39 have expected reproduction rates, the ages during which most people settle down and have kids. The last age group 40-49 has a low reproduction rate since members of this age group usually do not have kids, due to life-threatening complications that women may experience during pregnancy in their forties and due to the fact that women in this age group may have already undergone menopause. The survivability numbers are consistent across all the age groups which is to be expected of a healthier, more technologically and medically advanced society. The first group, those aged 0-9, are more likely to die since babies and infants, being more fragile and having weaker immune systems, than those older than them. The last age group, those aged 80 and above, are likelier to die than all preceding age groups due to senescence: death is inevitable at old age, and usually comes at around 80 years of age in the First World. The only glaring anomaly in this data is the fact that those aged 10-19 are reproducing at such a markedly high rate, which is abnormal if not entirely nonexistent in First World societies.
2. Statistics by decade:

Population distribution for 2000 =

[210000.0,

190000.0,

180000.0,

210000.0,

200000.0,

170000.0,

120000.0,

90000.0,

50000.0]

Total population for 2000 = 1420000

Population distribution for 2010 =

[635000.0,

147000.0,

161500.0,

162000.0,

189000.0,

176000.0,

136000.0,

92400.0,

198000.0]

Total population for 2010 = 1896900

Percent change in population from 2000 = 25.14 %

Population distribution for 2020 =

[1153750.0,

954625.0,

972931.0,

1037638.0,

1122874.0,

1164129.0,

1067303.0,

914223.0,

1439327.0]

Total population for 2020 = 9826800

Percent change in population from 2010 = 80.7 %

Population distribution for 2030 =

[4415686.0,

4045605.0,

4411695.0,

5008164.0,

5630222.0,

6118724.0,

5962282.0,

5505180.0,

7611924.0]

Total population for 2030 = 48709482

Percent change in population from 2020 = 79.83 %

Population distribution for 2040 =

[19193646.0,

17481157.0,

19270678.0,

22351774.0,

25746819.0,

28775925.0,

28983022.0,

27822107.0,

36084377.0]

Total population for 2040 = 225709505

Percent change in population from 2030 = 78.42 %

Population distribution for 2050 =

[84060059.0,

76323198.0,

84145396.0,

98082630.0,

114021186.0,

129114569.0,

132274677.0,

129673608.0,

163684677.0]

Total population for 2050 = 1011380000

Percent change in population from 2040 = 77.68 %

1. After 100 iterations, the following values were found:

Eigen value = 1.2886562339310283

Normalized eigen vectors = [0.788605252458693, 0.428371556498931, 0.2825546592153293, 0.19733671913265816, 0.13782034536675208, 0.09411501743391491, 0.058426764225129824, 0.034911256601081915, 0.20817320311709073]

1. The largest eigenvalue tells us the population’s growth rate over time. The right eigenvectors comprise the stable age distribution and the left eigenvectors comprise the reproductive value. Since the population growth rate is positive, the population will continue to grow and eventually become stable since the age groups are stable and the reproductive values are good for the younger age groups.
2. After 100 iterations, the following values were found:

Eigen value = 1.1679027367185855

Normalized eigen vectors = [0.72026702725753, 0.43170283211842364, 0.3141934647157854, 0.242121290886523, 0.18658160045940322, 0.14058688557028193, 0.09630040663508256, 0.06349100038703041, 0.26386659497423115]

Since the population growth rate is positive, the population will continue to grow and eventually become stable since the age groups are stable and the reproductive values are good for the younger age groups.