1a)

Denote type0 as a string of the form 0xxxx, and type1 as a string of the form 1xxxx.

Since probability of crossover=1, and the first part of the genes of the child will come from the first parent, whether a child will be type0 or type1 is completely dependent on parent 1. That is, if parent 1 is type1, the child will be type1, and if parent 1 is type0, the child will be type0. There is a 30/50 chance for parent 1 to be type1 and 20/50 chance for parent 1 to be type0. Therefore, if roulette wheel selection is employed with no mutation, the chance that a member in generation 1 will be of the form 1xxxx is 3/5. The chance that a member in generation 1 will be of the form 0xxxx is 2/5.

1b)

Again, there is a 3/5 chance to choose a string of form 1xxxx, and a 2/5 chance to choose a string of form 0xxxx. We also know that there is a 0.01 chance for the first bit to mutate. So to get a child of form 1xxxx, we either select a string of form 1xxxx and not mutate or select a string of form 0xxxx and mutate, and vice versa for a child of form 0xxxx. Therefore there is a (3/5)(0.99)+(2/5)(0.01)= 0.598 chance to get a child of form 1xxxx, and a (2/5)(0.99)+(3/5)(0.01)= 0.402 chance to get a child of form 0xxxx.