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myModel[populationSize_, mutationRate_] := (
  (*Set initial condition*)
  abFrequency = 1; (*frequency of the allele to be followed (A)*)
  AbFrequency = 0;
  aBFrequency = 0;
  ABFrequency = 0;
  numberOfGenerations = 1000;

  (*Initialise list in which we will save the frequencies from every pokolenie*)
  abfrequencies = Table[0, {numberOfGenerations}];
  Abfrequencies = Table[0, {numberOfGenerations}];
  aBfrequencies = Table[0, {numberOfGenerations}];
  ABfrequencies = Table[0, {numberOfGenerations}];

  For[i = 1, i ≤ numberOfGenerations, i++,

    (*mutation*)
    abFrequency = (1 - mutationRate)2 * abFrequency + (1 - mutationRate) *
      mutationRate * (AbFrequency + aBFrequency) + mutationRate2 * ABFrequency;
    AbFrequency = (1 - mutationRate)2 * AbFrequency + (1 - mutationRate) *
      mutationRate * (ABFrequency + aBFrequency) + mutationRate2 * aBFrequency;
    aBFrequency = (1 - mutationRate)2 * aBFrequency + (1 - mutationRate) *
      mutationRate * (ABFrequency + abFrequency) + mutationRate2 * AbFrequency;
    ABFrequency = (1 - mutationRate)2 * ABFrequency + (1 - mutationRate) *
      mutationRate * (aBFrequency + AbFrequency) + mutationRate2 * abFrequency;

    (*selection*)
    abw = 1;
    Abw = 1.01;
    aBw = 1.01;
    ABw = 1.012;
    w = abw * abFrequency + Abw * AbFrequency + aBw * aBFrequency + ABw * ABFrequency;
    abFrequency = abFrequency *  $\frac{abw}{w}$ ;
    AbFrequency = AbFrequency *  $\frac{Abw}{w}$ ;
    aBFrequency = aBFrequency *  $\frac{aBw}{w}$ ;
    ABFrequency = ABFrequency *  $\frac{ABw}{w}$ ;

    (*crossing*)
    De = abFrequency * ABFrequency - AbFrequency * aBFrequency;

    r = 0.1;

    abFrequency = abFrequency - r * De;
    AbFrequency = AbFrequency + r * De;
    aBFrequency = aBFrequency + r * De;
    ABFrequency = ABFrequency - r * De;

    (*sampling*)

```

```

abNa = RandomVariate[BinomialDistribution[populationSize, abFrequency]];
abFrequency =  $\frac{abNa}{populationSize}$ ;
AbNa = RandomVariate[BinomialDistribution[populationSize, AbFrequency]];
AbFrequency =  $\frac{AbNa}{populationSize}$ ;
aBNa = RandomVariate[BinomialDistribution[populationSize, aBFrequency]];
aBFrequency =  $\frac{aBNa}{populationSize}$ ;
ABNa = RandomVariate[BinomialDistribution[populationSize, ABFrequency]];
ABFrequency =  $\frac{ABNa}{populationSize}$ ;

(*saving values*)
abfrequencies[[i]] = abFrequency;
Abfrequencies[[i]] = AbFrequency;
aBfrequencies[[i]] = aBFrequency;
ABfrequencies[[i]] = ABFrequency;

];
Show[
  ListPlot[abfrequencies, PlotRange → Automatic, PlotStyle → Gray],
  ListPlot[Abfrequencies, PlotRange → Automatic, PlotStyle → Red],
  ListPlot[aBfrequencies, PlotRange → Automatic, PlotStyle → Green],
  ListPlot[ABfrequencies, PlotRange → Automatic, PlotStyle → Blue]
]
)

myModel[100000, 0.0001]

```

