IB Computer Science

Student_____

Computational Thinking

Date: _____

Directions: Create a 3-5 minute presentation that answers each of the following questions. Be sure to address the command term used in each question. The format of this assignment is up to you, options include:

a) a PowerPoint presentation (or nearpod or other similar presentation that can be downloaded and then posted to the class web site on hwmath.net/IBCS
b) a video – which can be downloaed and then posted on hwmath.net/IBCS
c) a poster – which will posted in the classroom, as well as photographed and posted on hwmath.net/IBCS.

Note: You may integrate screen shots of your Java code and program execution into your presentation. Your presentation may include a working demonstration of any programs that you write, but all parts of the problem must be addressed.

The Population Study Problem

A population study divides a metropolitan area into seven regions: A–G.

The following table shows the current population (in millions) of the regions.

Region	Current population (millions)
A	2.3
B	2.1
C	1.2
D	1.4
E	1.5
F	1.1
G	0.8

Two one-dimensional arrays, `Region` and `Curr_Pop`, are used to hold this data. For example, `Region[0] ='A'`. The population in region A is 2.3 million and 2.3 is found in `Curr_Pop[0]`.

1) Create a flow chart that will output the total population of the metropolitan area.
2) In your Cloud9 firstname_java work space create a population.java file that contains the Java declarations for two one-dimensional arrays as described above, and initialize the values according to the table provided.
3) Implement a method named totalPopulation that calculates and outputs the total population of the metropolitan area following the algorithm that you wrote in question 1.

IB Computer Science

Student_____

Computational Thinking

Date: _____

The numbers in the following table represent expected **percentages** of yearly migration from one region to another, obtained by analysing historical migration data. For example, it is expected that 0.32% of the current population of region B will move to region C.

The diagonal entries represent a region's internal growth rate. For example, the population of region C is expected to increase by 1.2% as a result of the births and deaths of people currently living in region C.

To / From	A	B	C	D	E	F	G
A	**1.10**	0.21	0.21	0.05	0.20	0.20	0.29
B	0.30	**1.20**	0.32	0.25	0.20	0.09	0.31
C	0.25	0.22	**1.20**	0.35	0.30	0.23	0.12
D	0.10	0.33	0.36	**1.30**	0.09	0.12	0.20
E	0.20	0.22	0.24	0.35	**1.00**	0.20	0.21
F	0.12	0.21	0.13	0.21	0.22	**1.40**	0.31
G	0.05	0.03	0.30	0.20	0.23	0.26	**0.90**

4. a State the **percentage** of the population of region G that are expected to move to region A.

4.b Determine the number of people from region B who are expected to move to region E.

4.c Describe how the change in population of region F in one year could be determined.

5. Construct the algorithm that will predict the population in each region after 10 years. You should assume that the yearly migration percentages given in the table remain the same over the 10 years.

6. In the file population.java add a declaration for a two-dimensional array named `migration` that can contain the data above. Initialize the `migration` table with the above data