Vir Desai
720329873
Collaborators: None

HW4

1. Implementation

There were three steps involved with this assignment, breaking down the image computations, training the LIBSVM model with a training set of images, and then testing those models with a separate set of images. I randomized which random images to use for each of the four image types by using a random sample method to get 70% for each class and used the other 30% as part of the testing set. I broke down my images using the built-in Image class that python has. That class already had a method to resize my images into 32x32 size and then I used their 'getdata()' function to get the RGB values. From there I created a long vector for a tiny image representation with R, G, and B values for each location in order from the top left to bottom right of the image. After that I created a 3D array of size 8x8x8 of all 0s. Then I ran through the tiny image long vector and placed added 1 to the index where the R value divided by 32, G value divided by 32, and B value divided by 32 were the 1st, 2nd, and 3rd indices. I looped through every image in the training and testing set to create two big total arrays, one for each.

After having the images broken down into their two representations I needed to use them to train the given support vector machine. Due to having a color histogram and tiny image vector representations I needed to create two svm_problems with them. The svm_train method too in a svm_problem as well as a parameter but the svm_problem had to say which images were 1, meaning correct, or 0, meaning incorrect, for the corresponding representations given. That being said, I then had to train the histogram and vector values with a RBF Kernel, as well as a Linear Kernel resulting in 4 trainers. Because the trained svm was only then looking for the positives of 1 of the image classes I had to then go and loop through each of the image classes and do the same for all of them. The Linear Kernel required setting the svm_parameters –t to 0, -b to 1, and then –c was a value I had to experimentally get to obtain the best results. The RBF Kernel required setting the svm_parameters –t to 2, -b to 1, and then –c and –g were experimentally found.

Testing required setting the –c svm_parameter for the Linear Kernel svm training model and both –c and –g for the RBF Kernel to the value I found best for each, the histogram and tiny image vector representations of each. Initially testing was done by training the svm with only have of the training set and using the other half to test it to find appropriate –c and –g values quicker than running the program on the entire training and then testing sets. When calling the svm_predict method for testing, it required giving it an value of 0 or 1 for which category the image was in, giving it a test image, giving it the trained model for that image type, and then setting the final option to –b 1 so it would perform an percentage accuracy calculation. This testing occurred over each of the testing images for all of the classes and then results for how well the algorithm performed on each were outputted by how well it predicted each class of images given to it. Using the svm_predict on each image with each of the different class svm models I took the argmax of the list of those to classify the image. At the end of this testing an output confusion matrix is displayed for each of the classifications with each of the 1st degree indices representing which class the image was actually, and the indices of the 2nd degree representing which class the image was predicted to be. This was how I found the overall accuracy for predicting each of the images of each of the classes for each of the classifications.

2. Performance/Classification Accuracies

The four training classifications were Tiny Image vector with Linear Kernel, Color Histogram with Linear Kernel, Tiny Image vector with RBF Kernel, and Color Histogram with RBF Kernel. The way I found which –c and –g parameter values were best for each of the classifications was by automatically going through all of the permutations of –c from 0.001 to 1000 by factors of 10 with –g from 0.001 to 1000 by factors of 10. This process took a decent amount of waiting for each class to be trained with the 49 different combinations, although only 7 were used to train the –c for Linear Kernel classifications. The outputs of all of the executions of this method are shown at the bottom of this document under the section named "Training Data." The results of what classification came out on top for each combination is:

C=0.01 for Tiny Image with Linear Kernel @ 88.3627%

C=0.1 for Color Histogram with Linear Kernel @ 78.2024%

C=0.1 and G=0.001 for Tiny Image with RBF Kernel @ 31.1089%

C=1 and G=0.001 for Color Histogram with RBF Kernel @ 81.1782%

It seems as though these were the best values to use for each method. I then tested the whole set using these values for the specific training parameters and the results are shown in Figure 1 in the "Figures" section below. The confusion matrix shown in that figure displays what was already stated. In the Figure, "HML" stands for Color Histogram with the Linear Kernel, "HMR" stands for Color Histogram with the RBF Kernel, "VML" stands for Tiny Image vector with the Linear Kernel, and "VMR" stands for Tiny Image vector with the RBF Kernel. It seems as though all of the methods other than the Tiny Image vector with the RBF Kernel perform at an accuracy of about 80% as shown. This can be shown by the percentage I show in the output as well as from the confusion matrix. The confusion matrix again is where each of the 1^{st} degree indices represents which class the image was actually tested, and the indices of the 2^{nd} degree represent which class the image was predicted to be. These values overall could be improved by training the svm with more images in each category. The model could take into account contrast of differences between images, so when a bag has 2 parallel contrasting straight lines then it has a higher chance of being a bag than a shoe. Additionally, if the images were all the same angle or if the angle the object was being looked at could be determined this would determine characteristics of the image better. These are partially because the methods take into account RGB values of the images instead of shape characteristics and such which would help figure out what each image is.

3. Example

Examples of my algorithm not performing well occurred many times in the Tiny Image vector with RBF Kernel as it seemed to always predict that the image was a clutch bag. Overall however, it seems as though for each of the classification parameters, womens_pumps are predicted at the lowest accuracy. This occurred because it was trained to say that images with color centralized in the middle were clutch bags and most of the images do so like that. Those which were predicted correctly though had other characteristics for this parameter training. For example Figure 2 was predicted correctly in the Tiny Image vector with RBF Kernel because that has a white gap in the middle of the image which occurs in many of the womens_pumps images and not in the others. On the other hand, the image shown in Figure 3 was predicted incorrectly as a clutch bag. This is because it has mostly solid color in the center of the image and projecting outward. This does not get predicted as anything else because the clutch

bags have the highest likeliness of having only color in the middle of the image. Figure 4 was predicted incorrectly as an bags_hobo and I believe this is so because of the long strap that exists in that image which occurs in mainly every hobo bag image instead of only in a few clutch bag ones this was one of the images predicted incorrectly for the “HMR” classification. Figure 5 was predicted correctly as a bags_clutch because there are numerous other images with almost the exact same look in that training set and nothing similar in terms of centralized coloring with no straps. Figure 6 was predicted incorrectly as womens_flats while Figure 7 and 8 were correctly predicted as bags_hobo. Figure 6 was incorrect because of the smaller size of the colored section as well as the very small strap. The percentage that the image was a hobo bag because of the strap coloring at the top of the image was less than that of the small color in the center that exists with womens_flats. Figure 7 and 8 were correct because both have color centralized with some size and the big looping straps which go across the tops of each image. Finally Figures 9 and 11 were both incorrectly identified as womens_pumps instead of flats and Figure 10 was correctly identified. Figure 9 and 11 were incorrectly identified because of the angle which exists in the color distribution for them. Figure 9 does not seem to have much angle but the small size of the nose of the shoe based on the shine it makes it seem pointed and therefore angled. Based on the color which would exist in these angled locations, the images are predicted as pumps instead of flats because most of the flats have similar amounts of colored pixels in rows along the middle instead of like pumps where it would increase and then decrease in number of colored pixels from top to bottom rows. Finally, Figure 10 was correctly identified based on the explanation I just laid out. The lack of shine on the nose separates it from being angled like a pump like Figure 9 and the fairly consistent amount of color which exists in it over the middle rows identifies it as a flat. The image is not identified as a bag because it does not have any strap like situation such as a hobo bag and does not have as much even central colored pixels as a clutch bag along with some angle.

Figures:

```
>>> ================================ RESTART ================================
>>>
HML: [[245, 26, 28, 4], [16, 263, 9, 18], [28, 3, 227, 46], [16, 20, 95, 174]]
HML: 80.8580858086, 85.9477124183, 74.6710526316, 57.0491803279
HML AVG: 74.6315077966
HMR: [[240, 25, 31, 7], [9, 273, 19, 5], [26, 0, 237, 41], [12, 8, 73, 212]]
HMR: 79.2079207921, 89.2156862745, 77.9605263158, 69.5081967213
HMR AVG: 78.9730825259
VML: [[268, 11, 17, 7], [19, 274, 4, 9], [13, 3, 261, 27], [19, 13, 16, 257]]
VML: 88.4488448845, 89.5424836601, 85.8552631579, 84.262295082
VML AVG: 87.0272216961
VMR: [[303, 0, 0, 0], [298, 8, 0, 0], [283, 0, 21, 0], [267, 0, 0, 38]]
VMR: 100.0, 2.61437908497, 6.90789473684, 12.4590163934
VMR AVG: 30.4953225538
>>>
```

Figure 1: Final test using the parameters discovered and the outputs from it

Figure 2: img_womens_pumps_921

Figure 3: img_womens_pumps_955

Figure 4: img_bags_clutch_147

Figure 5: img_bags_clutch_83

Figure 6: img_bags_hobo_412

Figure 7: img_bags_hobo_369

Figure 8: img_bags_hobo_224

Figure 9: img_womens_flats_129

Figure 10: img_womens_flats_490

Figure 11: img_womens_flats_603

Training Data (if you want to read any of it):

C: 0.001, G: 0.001
HML: [[225, 24, 46, 9], [13, 269, 13, 8], [26, 0, 245, 32], [30, 17, 102, 153]]
HML: 74.0131578947, 88.7788778878, 80.8580858086, 50.6622516556
HML AVG: 73.5780933117
HMR: [[220, 17, 58, 9], [18, 242, 21, 22], [46, 14, 213, 30], [53, 49, 69, 131]]
HMR: 72.3684210526, 79.8679867987, 70.297029703, 43.3774834437
HMR AVG: 66.4777302495
VML: [[271, 13, 15, 5], [13, 280, 3, 7], [9, 3, 264, 27], [13, 10, 23, 256]]
VML: 89.1447368421, 92.4092409241, 87.1287128713, 84.7682119205
VML AVG: 88.3627256395
VMR: [[20, 284, 0, 0], [0, 303, 0, 0], [0, 281, 22, 0], [0, 270, 0, 32]]
VMR: 6.57894736842, 100.0, 7.26072607261, 10.5960264901
VMR AVG: 31.1089249828

C: 0.001, G: 0.01
HML: [[450, 48, 92, 18], [26, 538, 26, 16], [52, 0, 490, 64], [60, 34, 204, 306]]
HML: 74.0131578947, 88.7788778878, 80.8580858086, 50.6622516556
HML AVG: 73.5780933117
HMR: [[248, 16, 27, 13], [24, 237, 24, 18], [48, 0, 205, 50], [48, 12, 59, 183]]

HMR: 81.5789473684, 78.2178217822, 67.6567656766, 60.5960264901
HMR AVG: 72.0123903293
VML: [[542, 26, 30, 10], [26, 560, 6, 14], [18, 6, 528, 54], [26, 20, 46, 512]]
VML: 89.1447368421, 92.4092409241, 87.1287128713, 84.7682119205
VML AVG: 88.3627256395
VMR: [[15, 289, 0, 0], [0, 303, 0, 0], [0, 284, 19, 0], [0, 280, 0, 22]]
VMR: 4.93421052632, 100.0, 6.27062706271, 7.28476821192
VMR AVG: 29.6224014502

C: 0.001, G: 0.1
HML: [[675, 72, 138, 27], [39, 807, 39, 24], [78, 0, 735, 96], [90, 51, 306, 459]]
HML: 74.0131578947, 88.7788778878, 80.8580858086, 50.6622516556
HML AVG: 73.5780933117
HMR: [[71, 222, 10, 1], [6, 292, 5, 0], [4, 190, 99, 10], [1, 234, 26, 41]]
HMR: 23.3552631579, 96.3696369637, 32.6732673267, 13.5761589404
HMR AVG: 41.4935815972
VML: [[813, 39, 45, 15], [39, 840, 9, 21], [27, 9, 792, 81], [39, 30, 69, 768]]
VML: 89.1447368421, 92.4092409241, 87.1287128713, 84.7682119205
VML AVG: 88.3627256395
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.001, G: 1.0
HML: [[900, 96, 184, 36], [52, 1076, 52, 32], [104, 0, 980, 128], [120, 68, 408, 612]]
HML: 74.0131578947, 88.7788778878, 80.8580858086, 50.6622516556
HML AVG: 73.5780933117
HMR: [[27, 274, 1, 2], [1, 301, 1, 0], [1, 278, 23, 1], [1, 274, 2, 25]]
HMR: 8.88157894737, 99.3399339934, 7.59075907591, 8.27814569536
HMR AVG: 31.022604428
VML: [[1084, 52, 60, 20], [52, 1120, 12, 28], [36, 12, 1056, 108], [52, 40, 92, 1024]]
VML: 89.1447368421, 92.4092409241, 87.1287128713, 84.7682119205
VML AVG: 88.3627256395
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 0.001, G: 10.0
HML: [[1125, 120, 230, 45], [65, 1345, 65, 40], [130, 0, 1225, 160], [150, 85, 510, 765]]
HML: 74.0131578947, 88.7788778878, 80.8580858086, 50.6622516556
HML AVG: 73.5780933117
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1355, 65, 75, 25], [65, 1400, 15, 35], [45, 15, 1320, 135], [65, 50, 115, 1280]]
VML: 89.1447368421, 92.4092409241, 87.1287128713, 84.7682119205
VML AVG: 88.3627256395
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]

VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.001, G: 100.0
HML: [[1350, 144, 276, 54], [78, 1614, 78, 48], [156, 0, 1470, 192], [180, 102, 612, 918]]
HML: 74.0131578947, 88.7788778878, 80.8580858086, 50.6622516556
HML AVG: 73.5780933117
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1626, 78, 90, 30], [78, 1680, 18, 42], [54, 18, 1584, 162], [78, 60, 138, 1536]]
VML: 89.1447368421, 92.4092409241, 87.1287128713, 84.7682119205
VML AVG: 88.3627256395
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 0.001, G: 1000.0
HML: [[1575, 168, 322, 63], [91, 1883, 91, 56], [182, 0, 1715, 224], [210, 119, 714, 1071]]
HML: 74.0131578947, 88.7788778878, 80.8580858086, 50.6622516556
HML AVG: 73.5780933117
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1897, 91, 105, 35], [91, 1960, 21, 49], [63, 21, 1848, 189], [91, 70, 161, 1792]]
VML: 89.1447368421, 92.4092409241, 87.1287128713, 84.7682119205
VML AVG: 88.3627256395
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 0.01, G: 0.001
HML: [[241, 24, 34, 5], [13, 268, 9, 13], [23, 0, 245, 35], [17, 9, 91, 185]]
HML: 79.2763157895, 88.4488448845, 80.8580858086, 61.2582781457
HML AVG: 77.4603811571
HMR: [[220, 17, 57, 10], [17, 242, 21, 23], [45, 14, 214, 30], [54, 48, 69, 131]]
HMR: 72.3684210526, 79.8679867987, 70.6270627063, 43.3774834437
HMR AVG: 66.5602385003
VML: [[271, 13, 15, 5], [12, 281, 2, 8], [10, 2, 261, 30], [13, 10, 23, 256]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[19, 285, 0, 0], [0, 303, 0, 0], [0, 282, 21, 0], [0, 273, 0, 29]]
VMR: 6.25, 100.0, 6.93069306931, 9.60264900662
VMR AVG: 30.695835519

C: 0.01, G: 0.01
HML: [[482, 48, 68, 10], [26, 536, 18, 26], [46, 0, 490, 70], [34, 18, 182, 370]]
HML: 79.2763157895, 88.4488448845, 80.8580858086, 61.2582781457

HML AVG: 77.4603811571
HMR: [[250, 16, 25, 13], [26, 237, 23, 17], [50, 0, 203, 50], [47, 14, 60, 181]]
HMR: 82.2368421053, 78.2178217822, 66.99669967, 59.9337748344
HMR AVG: 71.846284598
VML: [[542, 26, 30, 10], [24, 562, 4, 16], [20, 4, 522, 60], [26, 20, 46, 512]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[304, 0, 0, 0], [288, 15, 0, 0], [284, 0, 19, 0], [280, 0, 0, 22]]
VMR: 100.0, 4.9504950495, 6.27062706271, 7.28476821192
VMR AVG: 29.626472581

C: 0.01, G: 0.1
HML: [[723, 72, 102, 15], [39, 804, 27, 39], [69, 0, 735, 105], [51, 27, 273, 555]]
HML: 79.2763157895, 88.4488448845, 80.8580858086, 61.2582781457
HML AVG: 77.4603811571
HMR: [[70, 211, 19, 4], [4, 291, 7, 1], [3, 128, 140, 32], [1, 217, 38, 46]]
HMR: 23.0263157895, 96.0396039604, 46.204620462, 15.2317880795
HMR AVG: 45.1255820728
VML: [[813, 39, 45, 15], [36, 843, 6, 24], [30, 6, 783, 90], [39, 30, 69, 768]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.01, G: 1.0
HML: [[964, 96, 136, 20], [52, 1072, 36, 52], [92, 0, 980, 140], [68, 36, 364, 740]]
HML: 79.2763157895, 88.4488448845, 80.8580858086, 61.2582781457
HML AVG: 77.4603811571
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 253, 49, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 16.1716171617, 8.27814569536
HMR AVG: 32.9208370144
VML: [[1084, 52, 60, 20], [48, 1124, 8, 32], [40, 8, 1044, 120], [52, 40, 92, 1024]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.01, G: 10.0
HML: [[1205, 120, 170, 25], [65, 1340, 45, 65], [115, 0, 1225, 175], [85, 45, 455, 925]]
HML: 79.2763157895, 88.4488448845, 80.8580858086, 61.2582781457
HML AVG: 77.4603811571
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1355, 65, 75, 25], [60, 1405, 10, 40], [50, 10, 1305, 150], [65, 50, 115, 1280]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205

VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.01, G: 100.0
HML: [[1446, 144, 204, 30], [78, 1608, 54, 78], [138, 0, 1470, 210], [102, 54, 546, 1110]]
HML: 79.2763157895, 88.4488448845, 80.8580858086, 61.2582781457
HML AVG: 77.4603811571
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1626, 78, 90, 30], [72, 1686, 12, 48], [60, 12, 1566, 180], [78, 60, 138, 1536]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.01, G: 1000.0
HML: [[1687, 168, 238, 35], [91, 1876, 63, 91], [161, 0, 1715, 245], [119, 63, 637, 1295]]
HML: 79.2763157895, 88.4488448845, 80.8580858086, 61.2582781457
HML AVG: 77.4603811571
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1897, 91, 105, 35], [84, 1967, 14, 56], [70, 14, 1827, 210], [91, 70, 161, 1792]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.1, G: 0.001
HML: [[244, 25, 30, 5], [12, 270, 8, 13], [14, 1, 248, 40], [13, 13, 90, 186]]
HML: 80.2631578947, 89.1089108911, 81.8481848185, 61.5894039735
HML AVG: 78.2024143945
HMR: [[223, 20, 52, 9], [16, 249, 19, 19], [44, 0, 217, 42], [59, 21, 69, 153]]
HMR: 73.3552631579, 82.1782178218, 71.6171617162, 50.6622516556
HMR AVG: 69.4532235879
VML: [[271, 13, 15, 5], [13, 280, 3, 7], [9, 2, 262, 30], [13, 9, 24, 256]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[19, 285, 0, 0], [0, 303, 0, 0], [0, 282, 21, 0], [0, 275, 0, 27]]
VMR: 6.25, 100.0, 6.93069306931, 8.94039735099
VMR AVG: 30.5302726051

C: 0.1, G: 0.01

HML: [[488, 50, 60, 10], [24, 540, 16, 26], [28, 2, 496, 80], [26, 26, 180, 372]]
HML: 80.2631578947, 89.1089108911, 81.8481848185, 61.5894039735
HML AVG: 78.2024143945
HMR: [[252, 16, 24, 12], [22, 245, 20, 16], [50, 0, 206, 47], [50, 7, 61, 184]]
HMR: 82.8947368421, 80.8580858086, 67.9867986799, 60.9271523179
HMR AVG: 73.1666934121
VML: [[542, 26, 30, 10], [26, 560, 6, 14], [18, 4, 524, 60], [26, 18, 48, 512]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[15, 289, 0, 0], [0, 303, 0, 0], [0, 284, 19, 0], [0, 280, 0, 22]]
VMR: 4.93421052632, 100.0, 6.27062706271, 7.28476821192
VMR AVG: 29.6224014502

C: 0.1, G: 0.1
HML: [[732, 75, 90, 15], [36, 810, 24, 39], [42, 3, 744, 120], [39, 39, 270, 558]]
HML: 80.2631578947, 89.1089108911, 81.8481848185, 61.5894039735
HML AVG: 78.2024143945
HMR: [[72, 209, 19, 4], [3, 292, 7, 1], [4, 120, 136, 43], [1, 217, 38, 46]]
HMR: 23.6842105263, 96.3696369637, 44.8844884488, 15.2317880795
HMR AVG: 45.0425310046
VML: [[813, 39, 45, 15], [39, 840, 9, 21], [27, 6, 786, 90], [39, 27, 72, 768]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 0.1, G: 1.0
HML: [[976, 100, 120, 20], [48, 1080, 32, 52], [56, 4, 992, 160], [52, 52, 360, 744]]
HML: 80.2631578947, 89.1089108911, 81.8481848185, 61.5894039735
HML AVG: 78.2024143945
HMR: [[27, 266, 9, 2], [1, 300, 2, 0], [1, 253, 49, 0], [1, 261, 15, 25]]
HMR: 8.88157894737, 99.0099009901, 16.1716171617, 8.27814569536
HMR AVG: 33.0853106986
VML: [[1084, 52, 60, 20], [52, 1120, 12, 28], [36, 8, 1048, 120], [52, 36, 96, 1024]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.1, G: 10.0
HML: [[1220, 125, 150, 25], [60, 1350, 40, 65], [70, 5, 1240, 200], [65, 65, 450, 930]]
HML: 80.2631578947, 89.1089108911, 81.8481848185, 61.5894039735
HML AVG: 78.2024143945
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636

VML: [[1355, 65, 75, 25], [65, 1400, 15, 35], [45, 10, 1310, 150], [65, 45, 120, 1280]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 0.1, G: 100.0
HML: [[1464, 150, 180, 30], [72, 1620, 48, 78], [84, 6, 1488, 240], [78, 78, 540, 1116]]
HML: 80.2631578947, 89.1089108911, 81.8481848185, 61.5894039735
HML AVG: 78.2024143945
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1626, 78, 90, 30], [78, 1680, 18, 42], [54, 12, 1572, 180], [78, 54, 144, 1536]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 0.1, G: 1000.0
HML: [[1708, 175, 210, 35], [84, 1890, 56, 91], [98, 7, 1736, 280], [91, 91, 630, 1302]]
HML: 80.2631578947, 89.1089108911, 81.8481848185, 61.5894039735
HML AVG: 78.2024143945
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1897, 91, 105, 35], [91, 1960, 21, 49], [63, 14, 1834, 210], [91, 63, 168, 1792]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 1.0, G: 0.001
HML: [[240, 22, 32, 10], [14, 263, 13, 13], [19, 2, 245, 37], [16, 12, 91, 183]]
HML: 78.9473684211, 86.798679868, 80.8580858086, 60.5960264901
HML AVG: 76.8000401469
HMR: [[244, 23, 26, 11], [7, 271, 17, 8], [20, 0, 234, 49], [29, 8, 69, 196]]
HMR: 80.2631578947, 89.4389438944, 77.2277227723, 64.9006622517
HMR AVG: 77.9576217033
VML: [[271, 13, 15, 5], [13, 280, 2, 8], [11, 2, 260, 30], [14, 10, 23, 255]]
VML: 89.1447368421, 92.4092409241, 85.8085808581, 84.4370860927
VML AVG: 87.9499111792
VMR: [[20, 284, 0, 0], [0, 303, 0, 0], [0, 282, 21, 0], [0, 275, 0, 27]]
VMR: 6.57894736842, 100.0, 6.93069306931, 8.94039735099
VMR AVG: 30.6125094472

C: 1.0, G: 0.01
HML: [[480, 44, 64, 20], [28, 526, 26, 26], [38, 4, 490, 74], [32, 24, 182, 366]]
HML: 78.9473684211, 86.798679868, 80.8580858086, 60.5960264901
HML AVG: 76.8000401469
HMR: [[252, 22, 20, 10], [18, 263, 12, 10], [30, 1, 228, 44], [42, 5, 62, 193]]
HMR: 82.8947368421, 86.798679868, 75.2475247525, 63.9072847682
HMR AVG: 77.2120565577
VML: [[542, 26, 30, 10], [26, 560, 4, 16], [22, 4, 520, 60], [28, 20, 46, 510]]
VML: 89.1447368421, 92.4092409241, 85.8085808581, 84.4370860927
VML AVG: 87.9499111792
VMR: [[16, 288, 0, 0], [0, 303, 0, 0], [0, 284, 19, 0], [0, 280, 0, 22]]
VMR: 5.26315789474, 100.0, 6.27062706271, 7.28476821192
VMR AVG: 29.7046382923

C: 1.0, G: 0.1
HML: [[720, 66, 96, 30], [42, 789, 39, 39], [57, 6, 735, 111], [48, 36, 273, 549]]
HML: 78.9473684211, 86.798679868, 80.8580858086, 60.5960264901
HML AVG: 76.8000401469
HMR: [[72, 209, 9, 14], [6, 290, 3, 4], [5, 123, 120, 55], [1, 216, 31, 54]]
HMR: 23.6842105263, 95.7095709571, 39.603960396, 17.880794702
HMR AVG: 44.2196341454
VML: [[813, 39, 45, 15], [39, 840, 6, 24], [33, 6, 780, 90], [42, 30, 69, 765]]
VML: 89.1447368421, 92.4092409241, 85.8085808581, 84.4370860927
VML AVG: 87.9499111792
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 1.0, G: 1.0
HML: [[960, 88, 128, 40], [56, 1052, 52, 52], [76, 8, 980, 148], [64, 48, 364, 732]]
HML: 78.9473684211, 86.798679868, 80.8580858086, 60.5960264901
HML AVG: 76.8000401469
HMR: [[25, 268, 9, 2], [1, 299, 3, 0], [1, 252, 50, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 98.6798679868, 16.501650165, 8.27814569536
HMR AVG: 32.9208370144
VML: [[1084, 52, 60, 20], [52, 1120, 8, 32], [44, 8, 1040, 120], [56, 40, 92, 1020]]
VML: 89.1447368421, 92.4092409241, 85.8085808581, 84.4370860927
VML AVG: 87.9499111792
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 1.0, G: 10.0
HML: [[1200, 110, 160, 50], [70, 1315, 65, 65], [95, 10, 1225, 185], [80, 60, 455, 915]]
HML: 78.9473684211, 86.798679868, 80.8580858086, 60.5960264901
HML AVG: 76.8000401469
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]

HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1355, 65, 75, 25], [65, 1400, 10, 40], [55, 10, 1300, 150], [70, 50, 115, 1275]]
VML: 89.1447368421, 92.4092409241, 85.8085808581, 84.4370860927
VML AVG: 87.9499111792
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 1.0, G: 100.0
HML: [[1440, 132, 192, 60], [84, 1578, 78, 78], [114, 12, 1470, 222], [96, 72, 546, 1098]]
HML: 78.9473684211, 86.798679868, 80.8580858086, 60.5960264901
HML AVG: 76.8000401469
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1626, 78, 90, 30], [78, 1680, 12, 48], [66, 12, 1560, 180], [84, 60, 138, 1530]]
VML: 89.1447368421, 92.4092409241, 85.8085808581, 84.4370860927
VML AVG: 87.9499111792
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 1.0, G: 1000.0
HML: [[1680, 154, 224, 70], [98, 1841, 91, 91], [133, 14, 1715, 259], [112, 84, 637, 1281]]
HML: 78.9473684211, 86.798679868, 80.8580858086, 60.5960264901
HML AVG: 76.8000401469
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1897, 91, 105, 35], [91, 1960, 14, 56], [77, 14, 1820, 210], [98, 70, 161, 1785]]
VML: 89.1447368421, 92.4092409241, 85.8085808581, 84.4370860927
VML AVG: 87.9499111792
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 10.0, G: 0.001
HML: [[227, 25, 41, 11], [15, 265, 13, 10], [15, 3, 237, 48], [25, 18, 98, 161]]
HML: 74.6710526316, 87.4587458746, 78.2178217822, 53.3112582781
HML AVG: 73.4147196416
HMR: [[249, 25, 20, 10], [5, 280, 8, 10], [22, 0, 244, 37], [12, 7, 72, 211]]
HMR: 81.9078947368, 92.4092409241, 80.5280528053, 69.8675496689
HMR AVG: 81.1781845338
VML: [[271, 13, 15, 5], [13, 279, 2, 9], [10, 2, 261, 30], [13, 9, 24, 256]]
VML: 89.1447368421, 92.0792079208, 86.1386138614, 84.7682119205
VML AVG: 88.0326926362
VMR: [[19, 285, 0, 0], [0, 303, 0, 0], [0, 282, 21, 0], [0, 275, 0, 27]]

VMR: 6.25, 100.0, 6.93069306931, 8.94039735099
VMR AVG: 30.5302726051

C: 10.0, G: 0.01
HML: [[454, 50, 82, 22], [30, 530, 26, 20], [30, 6, 474, 96], [50, 36, 196, 322]]
HML: 74.6710526316, 87.4587458746, 78.2178217822, 53.3112582781
HML AVG: 73.4147196416
HMR: [[260, 17, 18, 9], [24, 266, 4, 9], [32, 1, 214, 56], [38, 7, 56, 201]]
HMR: 85.5263157895, 87.7887788779, 70.6270627063, 66.5562913907
HMR AVG: 77.6246121911
VML: [[542, 26, 30, 10], [26, 558, 4, 18], [20, 4, 522, 60], [26, 18, 48, 512]]
VML: 89.1447368421, 92.0792079208, 86.1386138614, 84.7682119205
VML AVG: 88.0326926362
VMR: [[15, 289, 0, 0], [0, 303, 0, 0], [0, 284, 19, 0], [0, 280, 0, 22]]
VMR: 4.93421052632, 100.0, 6.27062706271, 7.28476821192
VMR AVG: 29.6224014502

C: 10.0, G: 0.1
HML: [[681, 75, 123, 33], [45, 795, 39, 30], [45, 9, 711, 144], [75, 54, 294, 483]]
HML: 74.6710526316, 87.4587458746, 78.2178217822, 53.3112582781
HML AVG: 73.4147196416
HMR: [[76, 208, 8, 12], [5, 292, 3, 3], [7, 123, 126, 47], [2, 217, 32, 51]]
HMR: 25.0, 96.3696369637, 41.5841584158, 16.8874172185
HMR AVG: 44.9603031495
VML: [[813, 39, 45, 15], [39, 837, 6, 27], [30, 6, 783, 90], [39, 27, 72, 768]]
VML: 89.1447368421, 92.0792079208, 86.1386138614, 84.7682119205
VML AVG: 88.0326926362
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 10.0, G: 1.0
HML: [[908, 100, 164, 44], [60, 1060, 52, 40], [60, 12, 948, 192], [100, 72, 392, 644]]
HML: 74.6710526316, 87.4587458746, 78.2178217822, 53.3112582781
HML AVG: 73.4147196416
HMR: [[27, 266, 9, 2], [1, 300, 2, 0], [1, 253, 49, 0], [1, 261, 15, 25]]
HMR: 8.88157894737, 99.0099009901, 16.1716171617, 8.27814569536
HMR AVG: 33.0853106986
VML: [[1084, 52, 60, 20], [52, 1116, 8, 36], [40, 8, 1044, 120], [52, 36, 96, 1024]]
VML: 89.1447368421, 92.0792079208, 86.1386138614, 84.7682119205
VML AVG: 88.0326926362
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 10.0, G: 10.0
HML: [[1135, 125, 205, 55], [75, 1325, 65, 50], [75, 15, 1185, 240], [125, 90, 490, 805]]
HML: 74.6710526316, 87.4587458746, 78.2178217822, 53.3112582781

HML AVG: 73.4147196416
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1355, 65, 75, 25], [65, 1395, 10, 45], [50, 10, 1305, 150], [65, 45, 120, 1280]]
VML: 89.1447368421, 92.0792079208, 86.1386138614, 84.7682119205
VML AVG: 88.0326926362
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 10.0, G: 100.0
HML: [[1362, 150, 246, 66], [90, 1590, 78, 60], [90, 18, 1422, 288], [150, 108, 588, 966]]
HML: 74.6710526316, 87.4587458746, 78.2178217822, 53.3112582781
HML AVG: 73.4147196416
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1626, 78, 90, 30], [78, 1674, 12, 54], [60, 12, 1566, 180], [78, 54, 144, 1536]]
VML: 89.1447368421, 92.0792079208, 86.1386138614, 84.7682119205
VML AVG: 88.0326926362
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 10.0, G: 1000.0
HML: [[1589, 175, 287, 77], [105, 1855, 91, 70], [105, 21, 1659, 336], [175, 126, 686, 1127]]
HML: 74.6710526316, 87.4587458746, 78.2178217822, 53.3112582781
HML AVG: 73.4147196416
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1897, 91, 105, 35], [91, 1953, 14, 63], [70, 14, 1827, 210], [91, 63, 168, 1792]]
VML: 89.1447368421, 92.0792079208, 86.1386138614, 84.7682119205
VML AVG: 88.0326926362
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 100.0, G: 0.001
HML: [[211, 30, 50, 13], [18, 254, 18, 13], [16, 15, 239, 33], [29, 27, 100, 146]]
HML: 69.4078947368, 83.8283828383, 78.8778877888, 48.3443708609
HML AVG: 70.1146340562
HMR: [[249, 25, 19, 11], [15, 272, 4, 12], [21, 0, 238, 44], [11, 11, 72, 208]]
HMR: 81.9078947368, 89.7689768977, 78.5478547855, 68.8741721854
HMR AVG: 79.7747246514
VML: [[271, 13, 15, 5], [13, 280, 2, 8], [9, 2, 262, 30], [13, 10, 23, 256]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205

VML AVG: 88.1977091379
VMR: [[19, 285, 0, 0], [0, 303, 0, 0], [0, 282, 21, 0], [0, 275, 0, 27]]
VMR: 6.25, 100.0, 6.93069306931, 8.94039735099
VMR AVG: 30.5302726051

C: 100.0, G: 0.01
HML: [[422, 60, 100, 26], [36, 508, 36, 26], [32, 30, 478, 66], [58, 54, 200, 292]]
HML: 69.4078947368, 83.8283828383, 78.8778877888, 48.3443708609
HML AVG: 70.1146340562
HMR: [[262, 15, 17, 10], [27, 263, 4, 9], [32, 1, 214, 56], [39, 6, 53, 204]]
HMR: 86.1842105263, 86.798679868, 70.6270627063, 67.5496688742
HMR AVG: 77.7899054937
VML: [[542, 26, 30, 10], [26, 560, 4, 16], [18, 4, 524, 60], [26, 20, 46, 512]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[16, 288, 0, 0], [0, 303, 0, 0], [0, 284, 19, 0], [0, 280, 0, 22]]
VMR: 5.26315789474, 100.0, 6.27062706271, 7.28476821192
VMR AVG: 29.7046382923

C: 100.0, G: 0.1
HML: [[633, 90, 150, 39], [54, 762, 54, 39], [48, 45, 717, 99], [87, 81, 300, 438]]
HML: 69.4078947368, 83.8283828383, 78.8778877888, 48.3443708609
HML AVG: 70.1146340562
HMR: [[78, 207, 8, 11], [5, 292, 3, 3], [8, 118, 127, 50], [2, 217, 34, 49]]
HMR: 25.6578947368, 96.3696369637, 41.9141914191, 16.2251655629
HMR AVG: 45.0417221706
VML: [[813, 39, 45, 15], [39, 840, 6, 24], [27, 6, 786, 90], [39, 30, 69, 768]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 100.0, G: 1.0
HML: [[844, 120, 200, 52], [72, 1016, 72, 52], [64, 60, 956, 132], [116, 108, 400, 584]]
HML: 69.4078947368, 83.8283828383, 78.8778877888, 48.3443708609
HML AVG: 70.1146340562
HMR: [[27, 266, 9, 2], [1, 299, 3, 0], [1, 252, 50, 0], [1, 261, 15, 25]]
HMR: 8.88157894737, 98.6798679868, 16.501650165, 8.27814569536
HMR AVG: 33.0853106986
VML: [[1084, 52, 60, 20], [52, 1120, 8, 32], [36, 8, 1048, 120], [52, 40, 92, 1024]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 100.0, G: 10.0

HML: [[1055, 150, 250, 65], [90, 1270, 90, 65], [80, 75, 1195, 165], [145, 135, 500, 730]]
HML: 69.4078947368, 83.8283828383, 78.8778877888, 48.3443708609
HML AVG: 70.1146340562
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1355, 65, 75, 25], [65, 1400, 10, 40], [45, 10, 1310, 150], [65, 50, 115, 1280]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 100.0, G: 100.0
HML: [[1266, 180, 300, 78], [108, 1524, 108, 78], [96, 90, 1434, 198], [174, 162, 600, 876]]
HML: 69.4078947368, 83.8283828383, 78.8778877888, 48.3443708609
HML AVG: 70.1146340562
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1626, 78, 90, 30], [78, 1680, 12, 48], [54, 12, 1572, 180], [78, 60, 138, 1536]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577

C: 100.0, G: 1000.0
HML: [[1477, 210, 350, 91], [126, 1778, 126, 91], [112, 105, 1673, 231], [203, 189, 700, 1022]]
HML: 69.4078947368, 83.8283828383, 78.8778877888, 48.3443708609
HML AVG: 70.1146340562
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1897, 91, 105, 35], [91, 1960, 14, 56], [63, 14, 1834, 210], [91, 70, 161, 1792]]
VML: 89.1447368421, 92.4092409241, 86.4686468647, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 1000.0, G: 0.001
HML: [[127, 29, 85, 63], [19, 225, 25, 34], [11, 20, 225, 47], [22, 35, 98, 147]]
HML: 41.7763157895, 74.2574257426, 74.2574257426, 48.6754966887
HML AVG: 59.7416659908
HMR: [[248, 20, 21, 15], [18, 270, 3, 12], [25, 1, 225, 52], [11, 14, 69, 208]]
HMR: 81.5789473684, 89.1089108911, 74.2574257426, 68.8741721854
HMR AVG: 78.4548640469

VML: [[271, 13, 15, 5], [12, 281, 2, 8], [10, 3, 261, 29], [13, 10, 23, 256]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[19, 285, 0, 0], [0, 303, 0, 0], [0, 282, 21, 0], [0, 275, 0, 27]]
VMR: 6.25, 100.0, 6.93069306931, 8.94039735099
VMR AVG: 30.5302726051

C: 1000.0, G: 0.01
HML: [[254, 58, 170, 126], [38, 450, 50, 68], [22, 40, 450, 94], [44, 70, 196, 294]]
HML: 41.7763157895, 74.2574257426, 74.2574257426, 48.6754966887
HML AVG: 59.7416659908
HMR: [[263, 16, 15, 10], [27, 263, 4, 9], [32, 1, 211, 59], [40, 6, 55, 201]]
HMR: 86.5131578947, 86.798679868, 69.6369636964, 66.5562913907
HMR AVG: 77.3762732125
VML: [[542, 26, 30, 10], [24, 562, 4, 16], [20, 6, 522, 58], [26, 20, 46, 512]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[15, 289, 0, 0], [0, 303, 0, 0], [0, 284, 19, 0], [0, 280, 0, 22]]
VMR: 4.93421052632, 100.0, 6.27062706271, 7.28476821192
VMR AVG: 29.6224014502

C: 1000.0, G: 0.1
HML: [[381, 87, 255, 189], [57, 675, 75, 102], [33, 60, 675, 141], [66, 105, 294, 441]]
HML: 41.7763157895, 74.2574257426, 74.2574257426, 48.6754966887
HML AVG: 59.7416659908
HMR: [[78, 207, 8, 11], [5, 292, 3, 3], [8, 127, 127, 41], [2, 217, 34, 49]]
HMR: 25.6578947368, 96.3696369637, 41.9141914191, 16.2251655629
HMR AVG: 45.0417221706
VML: [[813, 39, 45, 15], [36, 843, 6, 24], [30, 9, 783, 87], [39, 30, 69, 768]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 1000.0, G: 1.0
HML: [[508, 116, 340, 252], [76, 900, 100, 136], [44, 80, 900, 188], [88, 140, 392, 588]]
HML: 41.7763157895, 74.2574257426, 74.2574257426, 48.6754966887
HML AVG: 59.7416659908
HMR: [[27, 266, 9, 2], [1, 299, 3, 0], [1, 252, 50, 0], [1, 261, 15, 25]]
HMR: 8.88157894737, 98.6798679868, 16.501650165, 8.27814569536
HMR AVG: 33.0853106986
VML: [[1084, 52, 60, 20], [48, 1124, 8, 32], [40, 12, 1044, 116], [52, 40, 92, 1024]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 1000.0, G: 10.0
HML: [[635, 145, 425, 315], [95, 1125, 125, 170], [55, 100, 1125, 235], [110, 175, 490, 735]]
HML: 41.7763157895, 74.2574257426, 74.2574257426, 48.6754966887
HML AVG: 59.7416659908
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1355, 65, 75, 25], [60, 1405, 10, 40], [50, 15, 1305, 145], [65, 50, 115, 1280]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 1000.0, G: 100.0
HML: [[762, 174, 510, 378], [114, 1350, 150, 204], [66, 120, 1350, 282], [132, 210, 588, 882]]
HML: 41.7763157895, 74.2574257426, 74.2574257426, 48.6754966887
HML AVG: 59.7416659908
HMR: [[25, 268, 1, 10], [1, 300, 0, 2], [1, 254, 21, 27], [1, 261, 2, 38]]
HMR: 8.22368421053, 99.0099009901, 6.93069306931, 12.582781457
HMR AVG: 31.6867649317
VML: [[1626, 78, 90, 30], [72, 1686, 12, 48], [60, 18, 1566, 174], [78, 60, 138, 1536]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[11, 293, 0, 0], [0, 303, 0, 0], [0, 286, 17, 0], [0, 283, 0, 19]]
VMR: 3.61842105263, 100.0, 5.61056105611, 6.29139072848
VMR AVG: 28.8800932093

C: 1000.0, G: 1000.0
HML: [[889, 203, 595, 441], [133, 1575, 175, 238], [77, 140, 1575, 329], [154, 245, 686, 1029]]
HML: 41.7763157895, 74.2574257426, 74.2574257426, 48.6754966887
HML AVG: 59.7416659908
HMR: [[25, 268, 9, 2], [1, 300, 2, 0], [1, 254, 48, 0], [1, 261, 15, 25]]
HMR: 8.22368421053, 99.0099009901, 15.8415841584, 8.27814569536
HMR AVG: 32.8383287636
VML: [[1897, 91, 105, 35], [84, 1967, 14, 56], [70, 21, 1827, 203], [91, 70, 161, 1792]]
VML: 89.1447368421, 92.7392739274, 86.1386138614, 84.7682119205
VML AVG: 88.1977091379
VMR: [[304, 0, 0, 0], [289, 14, 0, 0], [286, 0, 17, 0], [283, 0, 0, 19]]
VMR: 100.0, 4.6204620462, 5.61056105611, 6.29139072848
VMR AVG: 29.1306034577