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 1st degree indices represents which class the image was actually tested, and the indices of the 2nd 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:

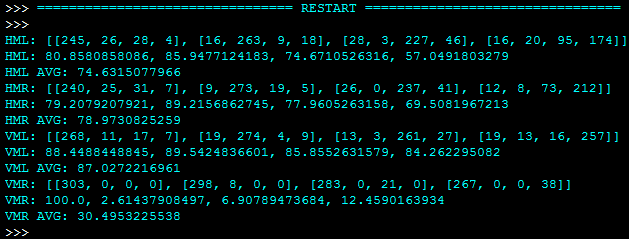


Figure 1: Final test using the parameters discovered and the outputs from it



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