

Final Project Report: Histogram

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1. For input file input_test.txt

A. The results of histogram computation for characters a to z with CPU version:

```
C:\WINDOWS\system32\cmd.exe
histogram frequency of characters a to z:
102 11 45 40 147 30 26 47 104 5 15 50 33 108 118 35 2 76 95 98 41 16 14 6 35 0
histogram frequency of characters in terms of percentiles:
0.0785 0.0085 0.0346 0.0308 0.1132 0.0231 0.0200 0.0362 0.0801 0.0038 0.0115 0.0
385 0.0254 0.0831 0.0908 0.0269 0.0015 0.0585 0.0731 0.0754 0.0316 0.0123 0.0108
0.0046 0.0269 0.0000
histogram frequency of character A to Z:
5 1 6 1 1 0 0 1 13 2 0 3 5 0 0 1 0 1 3 2 0 0 1 2 32 histogram frequency of char
acters in terms of percentiles:
0.0943 0.0189 0.1132 0.0189 0.0189 0.0000 0.0000 0.0189 0.2453 0.0377 0.0000 0.0
566 0.0943 0.0000 0.0000 0.0189 0.0000 0.0189 0.0566 0.0377 0.0000 0.0000 0.0189
0.0377 0.0566 0.0377
histogram frequency of character regardless of case:
107 12 51 41 148 30 26 48 117 7 15 53 38 108 118 36 2 77 98 100 41 16 15 8 38 2
histogram frequency of characters in terms of percentiles:
0.0791 0.0089 0.0377 0.0303 0.1095 0.0222 0.0192 0.0355 0.0865 0.0052 0.0111 0.0
392 0.0281 0.0799 0.0873 0.0266 0.0015 0.0570 0.0725 0.0740 0.0303 0.0118 0.0111
0.0059 0.0281 0.0015
Press any key to continue . . .
```

- B. The result of histogram computations for characters a to z, that for characters A to Z and result of histogram for all letters regardless of case are shown in following (implement in GPU versi

C:\WINDOWS\system32\cmd.exe

```
the number of blocks:1
histogram frequency of characters a to z:
102 11 45 40 147 30 26 47 104 5 15 50 33 108 118 35 2 76 95 98 41 16 14 6 35 0
histogram frequency of characters in terms of percentiles:
0.0785 0.0085 0.0346 0.0308 0.1132 0.0231 0.0200 0.0362 0.0801 0.0038 0.0115 0.0
385 0.0254 0.0831 0.0908 0.0269 0.0015 0.0585 0.0731 0.0754 0.0316 0.0123 0.0108
0.0046 0.0269 0.0000
histogram frequency of character A to Z:
5 1 6 1 1 0 0 1 13 2 0 3 5 0 0 1 0 1 3 2 0 0 1 2 3 2 histogram frequency of char
acters in terms of percentiles:
0.0943 0.0189 0.1132 0.0189 0.0189 0.0000 0.0000 0.0189 0.2453 0.0377 0.0000 0.0
566 0.0943 0.0000 0.0000 0.0189 0.0000 0.0189 0.0566 0.0377 0.0000 0.0000 0.0189
0.0377 0.0566 0.0377

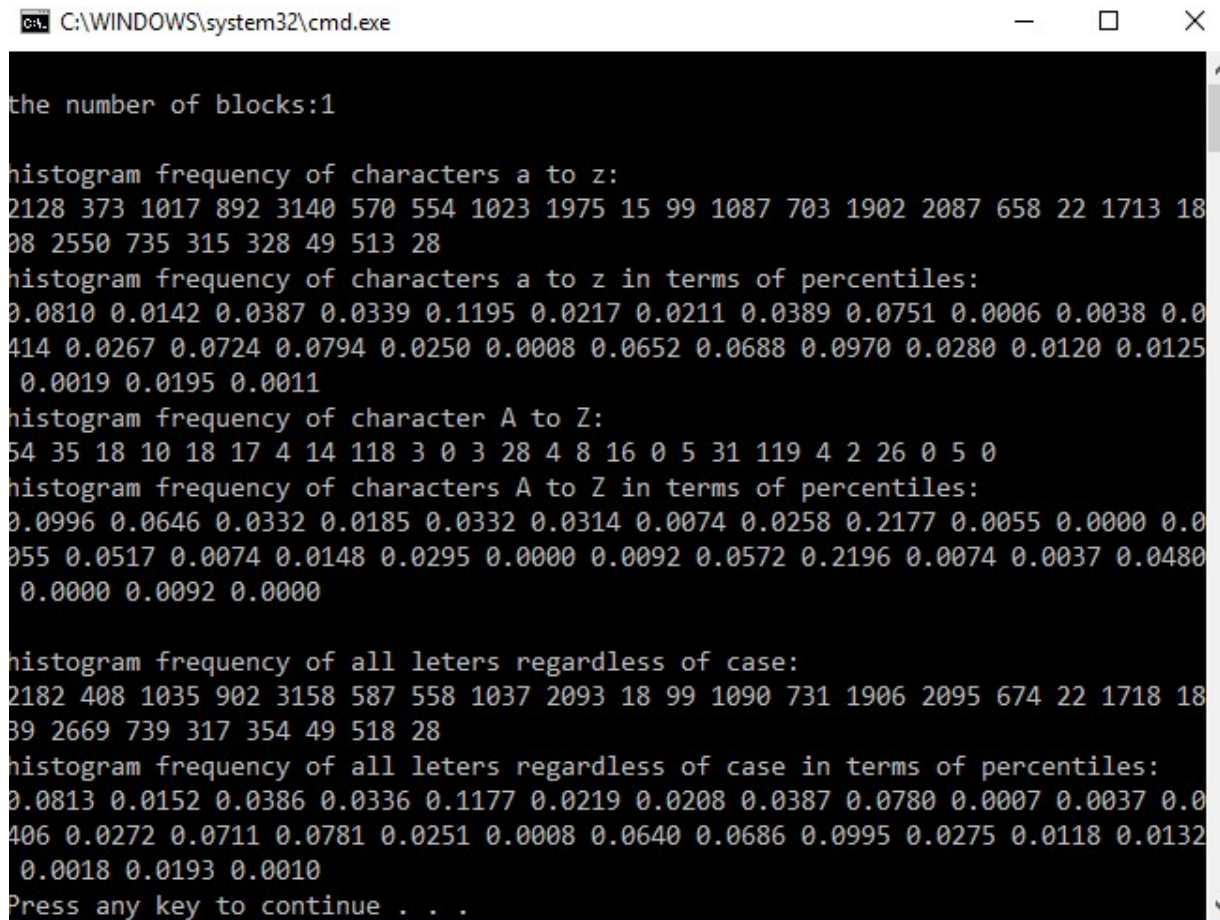
histogram frequency of character regardless of case:
107 12 51 41 148 30 26 48 117 7 15 53 38 108 118 36 2 77 98 100 41 16 15 8 38 2
histogram frequency of characters in terms of percentiles:
0.0791 0.0089 0.0377 0.0303 0.1095 0.0222 0.0192 0.0355 0.0865 0.0052 0.0111 0.0
392 0.0281 0.0799 0.0873 0.0266 0.0015 0.0570 0.0725 0.0740 0.0303 0.0118 0.0111
0.0059 0.0281 0.0015
Press any key to continue . . .
```

2. For input file input_data.txt

- A. The results of histogram computation for characters a to z, A to Z and all letters including both upper and lower case with CPU version is shown as following:

```
C:\WINDOWS\system32\cmd.exe
histogram frequency of characters a to z:
2128 373 1017 892 3140 570 554 1023 1975 15 99 1087 703 1902 2087 658 22 1713 18
08 2550 735 315 328 49 513 28
histogram frequency of characters in terms of percentiles:
0.0810 0.0142 0.0387 0.0339 0.1195 0.0217 0.0211 0.0389 0.0751 0.0006 0.0038 0.0
414 0.0267 0.0724 0.0794 0.0250 0.0008 0.0652 0.0688 0.0970 0.0280 0.0120 0.0125
0.0019 0.0195 0.0011
histogram frequency of character A to Z:
54 35 18 10 18 17 4 14 118 3 0 3 28 4 8 16 0 5 31 119 4 2 26 0 5 0 histogram fre
quency of characters in terms of percentiles:
0.0996 0.0646 0.0332 0.0185 0.0332 0.0314 0.0074 0.0258 0.2177 0.0055 0.0000 0.0
055 0.0517 0.0074 0.0148 0.0295 0.0000 0.0092 0.0572 0.2196 0.0074 0.0037 0.0480
0.0000 0.0092 0.0000
histogram frequency of character regardless of case:
2182 408 1035 902 3158 587 558 1037 2093 18 99 1090 731 1906 2095 674 22 1718 18
39 2669 739 317 354 49 518 28 histogram frequency of characters in terms of perc
entiles:
0.0813 0.0152 0.0386 0.0336 0.1177 0.0219 0.0208 0.0387 0.0780 0.0007 0.0037 0.0
406 0.0272 0.0711 0.0781 0.0251 0.0008 0.0640 0.0686 0.0995 0.0275 0.0118 0.0132
0.0018 0.0193 0.0010
Press any key to continue . . .
```


B. The results of histogram computation for characters a to z, A to Z and all letters including both upper and lower case with GPU version is shown as following:



```
C:\WINDOWS\system32\cmd.exe

the number of blocks:1

histogram frequency of characters a to z:
2128 373 1017 892 3140 570 554 1023 1975 15 99 1087 703 1902 2087 658 22 1713 18
08 2550 735 315 328 49 513 28
histogram frequency of characters a to z in terms of percentiles:
0.0810 0.0142 0.0387 0.0339 0.1195 0.0217 0.0211 0.0389 0.0751 0.0006 0.0038 0.0
414 0.0267 0.0724 0.0794 0.0250 0.0008 0.0652 0.0688 0.0970 0.0280 0.0120 0.0125
0.0019 0.0195 0.0011
histogram frequency of character A to Z:
54 35 18 10 18 17 4 14 118 3 0 3 28 4 8 16 0 5 31 119 4 2 26 0 5 0
histogram frequency of characters A to Z in terms of percentiles:
0.0996 0.0646 0.0332 0.0185 0.0332 0.0314 0.0074 0.0258 0.2177 0.0055 0.0000 0.0
055 0.0517 0.0074 0.0148 0.0295 0.0000 0.0092 0.0572 0.2196 0.0074 0.0037 0.0480
0.0000 0.0092 0.0000

histogram frequency of all letters regardless of case:
2182 408 1035 902 3158 587 558 1037 2093 18 99 1090 731 1906 2095 674 22 1718 18
39 2669 739 317 354 49 518 28
histogram frequency of all letters regardless of case in terms of percentiles:
0.0813 0.0152 0.0386 0.0336 0.1177 0.0219 0.0208 0.0387 0.0780 0.0007 0.0037 0.0
406 0.0272 0.0711 0.0781 0.0251 0.0008 0.0640 0.0686 0.0995 0.0275 0.0118 0.0132
0.0018 0.0193 0.0010
Press any key to continue . . .
```

Conclusion:

It can be seen that for same input file, the results of histogram computation using CPU and that using GPU are exactly same, therefore the code of application implemented by GPU is correct.