科目名: プログラミング実習III

課題: B７

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[課題 7.1]

結果：

chosunghwa@joseonghwaui-MacBookAir 7-1 % ./a.out

n = 5

[0] : 6

[1] : 2

[2] : 4

[3] : 9

[4] : 8

[0] 6.00000

[1] 2.00000

[2] 4.00000

[3] 9.00000

[4] 8.00000

k = 0

swapmin(n, a, 0)

[0] 2.00000

[1] 6.00000

[2] 4.00000

[3] 9.00000

[4] 8.00000

k = 1

swapmin(n, a, 1)

[0] 2.00000

[1] 4.00000

[2] 6.00000

[3] 9.00000

[4] 8.00000

k = 2

swapmin(n, a, 2)

[0] 2.00000

[1] 4.00000

[2] 6.00000

[3] 9.00000

[4] 8.00000

k = 3

swapmin(n, a, 3)

[0] 2.00000

[1] 4.00000

[2] 6.00000

[3] 8.00000

[4] 9.00000

k =

感想：

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[課題 7.2]

結果：

chosunghwa@joseonghwaui-MacBookAir 7-2 % gcc sort\_test.c selection\_sort.c

chosunghwa@joseonghwaui-MacBookAir 7-2 % ./a.out

n = 5

[0] : 1

[1] : 2

[2] : 3

[3] : 4

[4] : 5

1.0 2.0 3.0 4.0 5.0

n = 5

[0] : 5

[1] : 4

[2] : 3

[3] : 2

[4] : 1

1.0 2.0 3.0 4.0 5.0

n = 3

[0] : 0.3

[1] : 0.2

[2] : 0.1

0.1 0.2 0.3

n = %

chosunghwa@joseonghwaui-MacBookAir 7-2 %

chosunghwa@joseonghwaui-MacBookAir 7-2 % diff -w out.txt exp.txt

chosunghwa@joseonghwaui-MacBookAir 7-2 %

感想：

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[課題 7.3]

結果：

chosunghwa@joseonghwaui-MacBookAir 7-3 % ./a.out

n = 5

[0] : 6

[1] : 2

[2] : 4

[3] : 9

[4] : 8

[0] 6.00000

[1] 2.00000

[2] 4.00000

[3] 9.00000

[4] 8.00000

k = 1

insert(n, a, 1)

[0] 2.00000

[1] 6.00000

[2] 4.00000

[3] 9.00000

[4] 8.00000

k = 2

insert(n, a, 2)

[0] 2.00000

[1] 4.00000

[2] 6.00000

[3] 9.00000

[4] 8.00000

k = 3

insert(n, a, 3)

[0] 2.00000

[1] 4.00000

[2] 6.00000

[3] 9.00000

[4] 8.00000

k = 4

insert(n, a, 4)

[0] 2.00000

[1] 4.00000

[2] 6.00000

[3] 8.00000

[4] 9.00000

k = %

chosunghwa@joseonghwaui-MacBookAir 7-3 %

感想：

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[課題 7.4]

結果：

chosunghwa@joseongcBookAir 7-4 % gcc sort\_test.c insertion\_sort.c

chosunghwa@joseongcBookAir 7-4 % ./a.out

n = 5

[0] : 6

[1] : 2

[2] : 4

[3] : 9

[4] : 8

2.0 4.0 6.0 8.0 9.0

n =

感想：

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[課題 7.5]

結果：

chosunghwa@joseonghwaui-MacBookAir 7-5 % gcc selection\_sort.c sort\_cpu.c

chosunghwa@joseonghwaui-MacBookAir 7-5 % ./a.out

乱数

16807.00000

282475249.00000

1622650073.00000

984943658.00000

1144108930.00000

470211272.00000

101027544.00000

1457850878.00000

n = 1024

cpu = 0.002196 [sec]

n = 2048

cpu = 0.008062 [sec]

n = 4096

cpu = 0.024055 [sec]

n = 8192

cpu = 0.056967 [sec]

n = 16384

cpu = 0.170223 [sec]

n = 32768

cpu = 0.680871 [sec]

n = 65536

cpu = 2.753326 [sec]

正順

0.00000

1.00000

2.00000

3.00000

4.00000

5.00000

6.00000

7.00000

n = 1024

cpu = 0.000671 [sec]

n = 2048

cpu = 0.002670 [sec]

n = 4096

cpu = 0.010566 [sec]

n = 8192

cpu = 0.042675 [sec]

n = 16384

cpu = 0.168986 [sec]

n = 32768

cpu = 0.675149 [sec]

n = 65536

cpu = 2.712387 [sec]

逆順

65535.00000

65534.00000

65533.00000

65532.00000

65531.00000

65530.00000

65529.00000

65528.00000

n = 1024

cpu = 0.000761 [sec]

n = 2048

cpu = 0.002984 [sec]

n = 4096

cpu = 0.011941 [sec]

n = 8192

cpu = 0.048283 [sec]

n = 16384

cpu = 0.191477 [sec]

n = 32768

cpu = 0.757832 [sec]

n = 65536

cpu = 3.061792 [sec]

chosunghwa@joseonghwaui-MacBookAir 7-5 %

chosunghwa@joseonghwaui-MacBookAir 7-5 % gcc -O2 sort\_cpu.c selection\_sort.c

chosunghwa@joseonghwaui-MacBookAir 7-5 % ./a.out

乱数

16807.00000

282475249.00000

1622650073.00000

984943658.00000

1144108930.00000

470211272.00000

101027544.00000

1457850878.00000

n = 1024

cpu = 0.001941 [sec]

n = 2048

cpu = 0.018368 [sec]

n = 4096

cpu = 0.049780 [sec]

n = 8192

cpu = 0.120004 [sec]

n = 16384

cpu = 0.468012 [sec]

n = 32768

cpu = 1.848559 [sec]

n = 65536

cpu = 7.423799 [sec]

正順

0.00000

1.00000

2.00000

3.00000

4.00000

5.00000

6.00000

7.00000

n = 1024

cpu = 0.001764 [sec]

n = 2048

cpu = 0.007267 [sec]

n = 4096

cpu = 0.029758 [sec]

n = 8192

cpu = 0.120218 [sec]

n = 16384

cpu = 0.470440 [sec]

n = 32768

cpu = 1.852288 [sec]

n = 65536

cpu = 7.382035 [sec]

逆順

65535.00000

65534.00000

65533.00000

65532.00000

65531.00000

65530.00000

65529.00000

65528.00000

n = 1024

cpu = 0.001696 [sec]

n = 2048

cpu = 0.007043 [sec]

n = 4096

cpu = 0.028973 [sec]

n = 8192

cpu = 0.114823 [sec]

n = 16384

cpu = 0.460036 [sec]

n = 32768

cpu = 1.843463 [sec]

n = 65536

cpu = 7.377457 [sec]

chosunghwa@joseonghwaui-MacBookAir 7-5 %

chosunghwa@joseonghwaui-MacBookAir 7-5 % gcc -O2 sort\_cpu.c insertion\_sort.c

chosunghwa@joseonghwaui-MacBookAir 7-5 % ./a.out

乱数

16807.00000

282475249.00000

1622650073.00000

984943658.00000

1144108930.00000

470211272.00000

101027544.00000

1457850878.00000

n = 1024

cpu = 0.000896 [sec]

n = 2048

cpu = 0.003159 [sec]

n = 4096

cpu = 0.010745 [sec]

n = 8192

cpu = 0.031179 [sec]

n = 16384

cpu = 0.088383 [sec]

n = 32768

cpu = 0.905145 [sec]

n = 65536

cpu = 4.603005 [sec]

正順

0.00000

1.00000

2.00000

3.00000

4.00000

5.00000

6.00000

7.00000

n = 1024

cpu = 0.000192 [sec]

n = 2048

cpu = 0.000707 [sec]

n = 4096

cpu = 0.002788 [sec]

n = 8192

cpu = 0.010880 [sec]

n = 16384

cpu = 0.043825 [sec]

n = 32768

cpu = 0.171604 [sec]

n = 65536

cpu = 0.675348 [sec]

逆順

65535.00000

65534.00000

65533.00000

65532.00000

65531.00000

65530.00000

65529.00000

65528.00000

n = 1024

cpu = 0.000182 [sec]

n = 2048

cpu = 0.000691 [sec]

n = 4096

cpu = 0.002683 [sec]

n = 8192

cpu = 0.010939 [sec]

n = 16384

cpu = 0.042592 [sec]

n = 32768

cpu = 0.171122 [sec]

n = 65536

cpu = 0.687262 [sec]

chosunghwa@joseonghwaui-MacBookAir 7-5 %

感想・考察：

最適化した場合はすべての場合によって早くなりました。特に、**Nの値が**大きいほど実行時間がもっと早くなリました。

初期データが乱数, 正順, 逆順の場合の計算時間はほぼ同じでした。

Nの増加に対してnの値が大きいほど大きな割合で計算時間が増えました。

Insertion\_sortも同じく最適化するとほぼ１０倍以上計算時間が早くなりました。

乱数の場合より、正順, 逆順の方がより短い計算時間を持ち、正順, 逆順はほぼ同じでした。また、nの値が大きいほど大きい割合で計算時間が増えました

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[課題 7.6]

結果：

chosunghwa@joseongcBookAir B7 % cd 7-6

chosunghwa@joseongcBookAir 7-6 % gcc sort\_test.c quick\_sort.c

chosunghwa@joseongcBookAir 7-6 % ./a.out

n = 65536

Assertion failed: (0 < n && n <= MAX\_N), function array\_scan, file sort\_test.c, line 18.

zsh: abort ./a.out

chosunghwa@joseongcBookAir 7-6 % ./a.out

n = 5

[0] : 6

[1] : 2

[2] : 4

[3] : 9

[4] : 8

2.0 4.0 6.0 8.0 9.0

n = ^C

感想：

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[課題 7.7]

結果：

chosunghwa@joseongcBookAir 7-7 % gcc string\_sort.c string\_sort\_test.c

chosunghwa@joseongcBookAir 7-7 % ./a.out

n = ^C

chosunghwa@joseongcBookAir 7-7 % ./a.out < in.txt > out.txt

n = [0] : [1] : [2] : [3] : [4] : %

chosunghwa@joseongcBookAir 7-7 % diff -w exp.txt out.txt

感想：

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[課題 7.8]

結果：

chosunghwa@joseongcBookAir 7-8 % gcc str\_sort.c str\_sort\_test.c

chosunghwa@joseongcBookAir 7-8 % ./a.out

n = %

chosunghwa@joseongcBookAir 7-8 % ./a.out < in.txt > out.txt

n = [0].name : [0].age : [0].height : [1].name : [1].age : [1].height : [2].name : [2].age : [2].height : [3].name : [3].age : [3].height : [4].name : [4].age : [4].height : [5].name : [5].age : [5].height : %

chosunghwa@joseongcBookAir 7-8 % diff -w exp.txt out.txt

chosunghwa@joseongcBookAir 7-8 %

感想：

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[課題 B7 の感想]

前回に続いてリスト処理に関して復習し、加えてソーティングに関し学習ができた授業でした。また、7-5のCPU最適化に関して勉強、実装する時が一番興味深いでした。