

D:\PROGRAM_CPP\517021910499_cmy\bin\Release\517021910499_cmy.exe

```
the time of heap(10000) 7.25ms
the time of heap(50000) 35.5ms
the time of heap(100000) 71ms
the time of heap(200000) 142.05ms
the time of heap(500000) 367.9ms
Process returned 0 (0x0)    execution time : 12.710 s
Press any key to continue.
```

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```
the time of bubble(10000) 149ms
the time of bubble(50000) 3987ms
the time of bubble(100000) 16213ms
the time of bubble(200000) 65257ms
the time of bubble(500000) 409594ms
Process returned 0 (0x0)    execution time : 495.435 s
Press any key to continue.
```

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```
the time of quick(10000)6.2ms
the time of quick(50000)31.2ms
the time of quick(100000)62.4ms
the time of quick(200000)120.6ms
the time of quick(500000)306ms
Process returned 0 (0x0)    execution time : 5.928 s
Press any key to continue.
```

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```
the time of bucket(10000)6.2ms
the time of bubble(50000)29.7ms
the time of bucket(100000)60.3ms
the time of bucket(200000)122.4ms
the time of bucket(500000)313ms
Process returned 0 (0x0)    execution time : 5.593 s
Press any key to continue.
```

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```
the time of shell(10000)7.3ms
the time of shell(50000)37.2ms
the time of shell(100000)76.3ms
the time of shell(200000)154.05ms
the time of shell(500000)396.25ms
Process returned 0 (0x0)    execution time : 13.636 s
Press any key to continue.
```

排序测试结果如上图所示，将运行结果汇总下表（单位：毫秒）

size	heap	bubble	quick	bucket	shell
10000	7.25	149	6.2	6.2	7.3
50000	35.5	3987	31.2	29.7	37.2
100000	71	16213	62.4	60.3	76.3
200000	142.05	65257	120.6	122.4	154.05
500000	367.9	409594	306	313	396.25

可以看出，冒泡排序是性能最差的算法，运行时间比其他算法大了两个数量级，并且随着数据大小的增加呈非线性增长，与其他算法的时间差距越来越大。其他四种算法时间性能大致相同，随着数据大小的增长运算时间大致以线性关系增长。其中快速排序和基数排序的性能略好于希尔排序和堆排序。

bfs 算法检测 1:

```
D:\PROGRAM_CPP\517021910499_cmy\bin\Release\517021910499_cmy.exe
1      4      3      2      6      7      5
yes5    2      4      3      1      6      7
yes5    2      4      3      1      6      7
no9     8
no
Process returned 0 (0x0)    execution time : 0.488 s
Press any key to continue.
```

bfs 算法检测 2:

```
D:\PROGRAM_CPP\517021910499_cmy\bin\Release\517021910499_cmy.exe
1      4      2      6      3      5
no10    8      9      6      5      3      2      1      4
yes9    10     8      6      5      3      2      1      4
yes2    3
no
Process returned 0 (0x0)    execution time : 0.522 s
Press any key to continue.
```

dfs 算法检测 1:

```
D:\PROGRAM_CPP\517021910499_cmy\bin\Release\517021910499_cmy.exe
1      4      6      7      3      2      5      yes
5      2      4      6      7      3      1      yes
5      2      4      6      7      3      1      no
9      8      no

Process returned 0 (0x0)    execution time : 0.674 s
Press any key to continue.
```

dfs 算法检测 2:

```
1      4      6      5      3      2      no
10     8      9      6      5      3      2      1      4      yes
9      10     8      6      5      3      2      1      4      yes
2      3      no

Process returned 0 (0x0)   execution time : 0.533 s
Press any key to continue.
```

Prim 检测:

```
D:\PROGRAM_CPP\517021910499_cmy\bin\Release\517021910499_cmy.exe
(1, 2) (1, 3) (3, 6) (6, 8) (8, 5) (5, 4) (5, 7) (7, 9)
Process returned 0 (0x0)   execution time : 0.487 s
Press any key to continue.
```

Kruskal 检测:

```
(3, 6) (4, 5) (6, 8) (1, 2) (5, 8) (5, 7) (1, 3) (7, 9)
Process returned 0 (0x0)   execution time : 0.782 s
Press any key to continue.
```

Dijkstra 检测 1:

```
from1to1path
1 len:0
from1to2path
1-3-2 len:5
from1to3path
1-3 len:3
from1to4path
1-3-4 len:6
from1to5path
1-3-5 len:7
from1to6path
1-3-4-6 len:9

Process returned 0 (0x0)   execution time : 0.000 s
Press any key to continue.
```

Dijkstra 检测 2:

```
fromlto1path
1 len:0
fromlto2path
1-2 len:10
fromlto3path
1-4-3 len:50
fromlto4path
1-4 len:30
fromlto5path
1-4-3-5 len:60

Process returned 0 (0x0)   exec
Press any key to continue.
```

Floyd 检测 1:

```
D:\PROGRAM_CPP\517021910499_cmy\bin\release\517021910499_cmy.exe
minlen
0      5      3      6      7      9
5      0      2      5      6      8
3      2      0      3      4      6
6      5      3      0      2      3
7      6      4      2      0      5
9      8      6      3      5      0
shortestpath
0      0      0      -1     -1     -1
1      1      1      1      -1     -1
2      2      2      2      2      -1
-1     3      3      3      3      3
-1     -1     4      4      4      4
-1     -1     -1     5      5      5
Process returned 0 (0x0)   execution time : 0.493 s
Press any key to continue.
```

Floyd 检测 2:

```
D:\PROGRAMMING\17021310455_chy\bin\release\17021310455_chy.exe
5minlen
0      10      50      30      60
10      0      50      40      60
50      50      0      20      10
30      40      20      0      30
60      60      10      30      0
shortestpath
0      0      -1      0      0
1      1      1      -1     -1
-1      2      2      2      2
3      -1      3      3      3
4      -1      4      4      4
Process returned 0 (0x0)    execution time : 0.590 s
Press any key to continue.
```