HW7 Graphs

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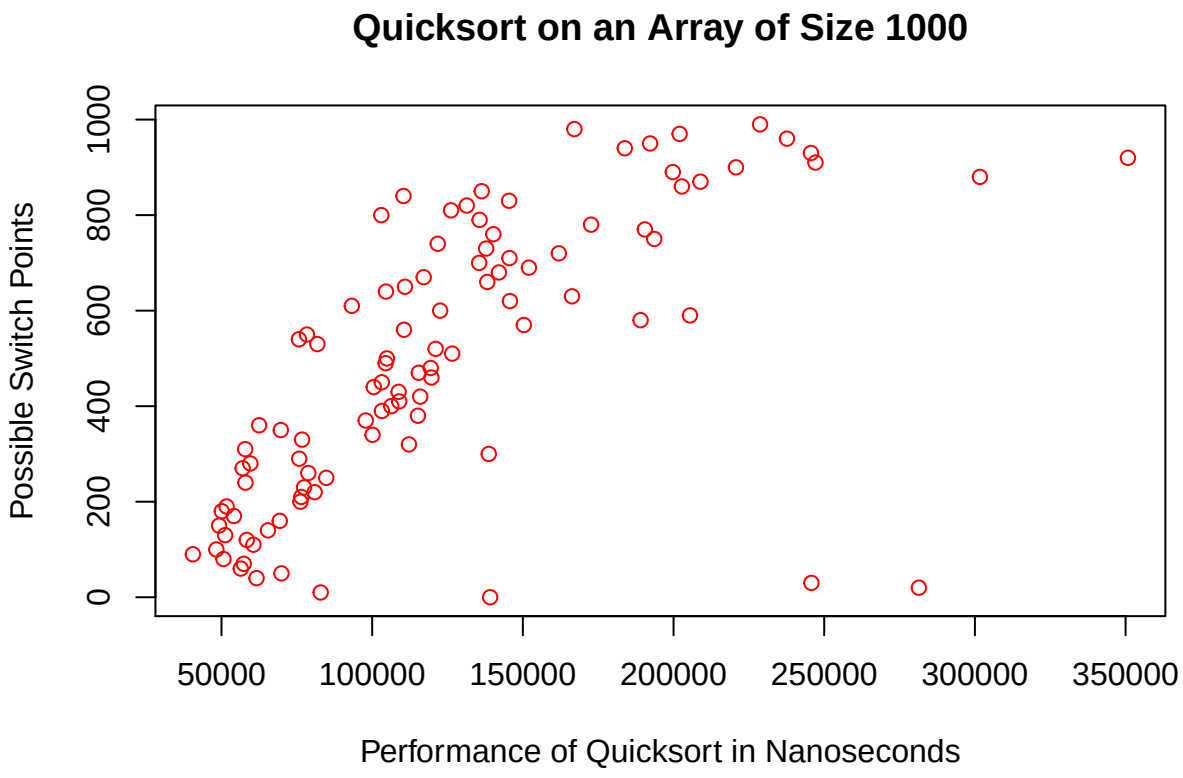
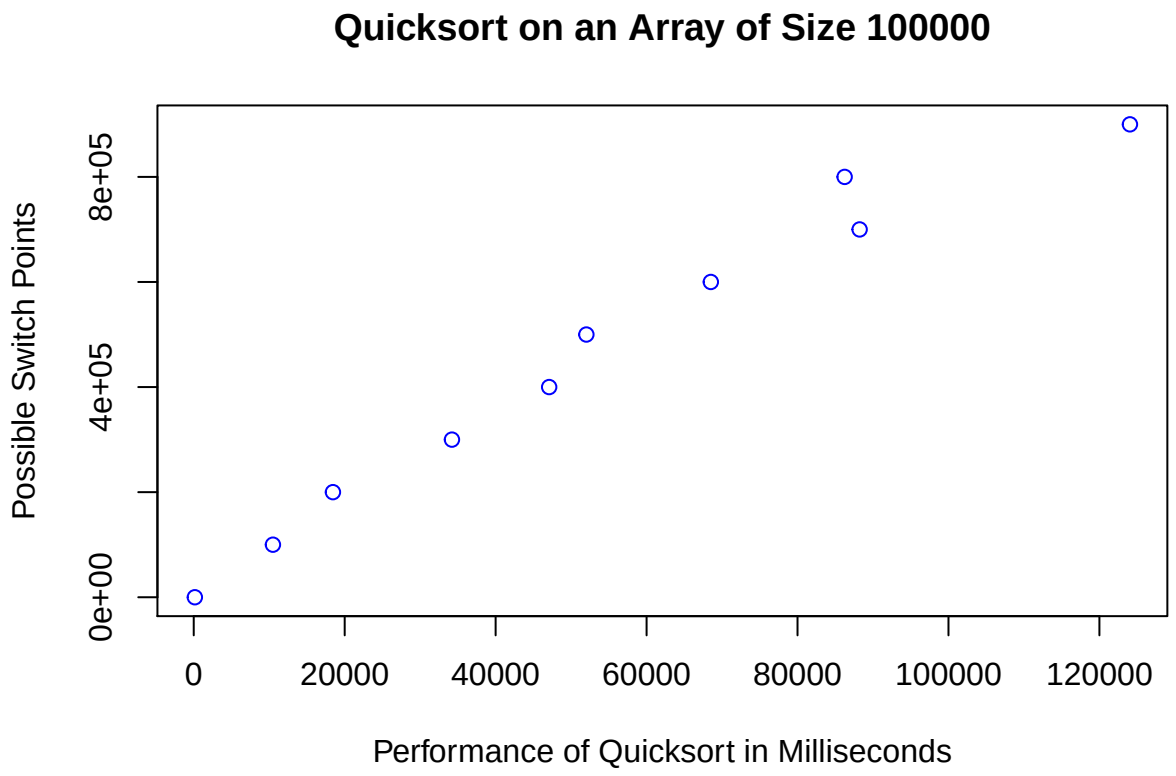
```
thresholdsSmaller <- c(0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120,
                       130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230,
                       240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340,
                       350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450,
                       460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560,
                       570, 580, 590, 600, 610, 620, 630, 640, 650, 660, 670,
                       680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780,
                       790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890,
                       900, 910, 920, 930, 940, 950, 960, 970, 980, 990)
sortTimesSmaller <- c(139154, 82910, 281402, 245754, 61629, 69899, 56401, 57376,
                      50660, 40493, 48289, 60602, 58390, 51200, 65422, 49211,
                      69333, 54110, 50107, 51687, 76181, 76484, 80908, 77392,
                      57955, 84767, 78814, 57020, 59575, 75772, 138680, 57863,
                      112197, 76734, 100121, 69675, 62485, 97856, 115186, 103229,
                      106337, 108971, 115950, 108760, 100530, 103177, 119664,
                      115476, 119414, 104467, 104888, 126551, 121047, 81817,
                      75693, 78353, 110551, 150320, 189063, 205445, 122561,
                      93247, 145712, 166307, 104559, 110880, 138192, 117096,
                      142064, 152006, 135493, 145553, 161949, 137823, 121758,
                      193606, 140207, 190485, 172642, 135637, 103032, 126156,
                      131371, 145422, 110393, 136349, 202772, 208935, 301656,
                      199756, 220721, 247098, 350788, 245610, 183822, 192224,
                      237643, 202021, 167098, 228714)
plot(sortTimesSmaller, thresholdsSmaller,
     xlab = "Performance of Quicksort in Nanoseconds",
     ylab = "Possible Switch Points", col = "red",
     main = "Quicksort on an Array of Size 1000")
```

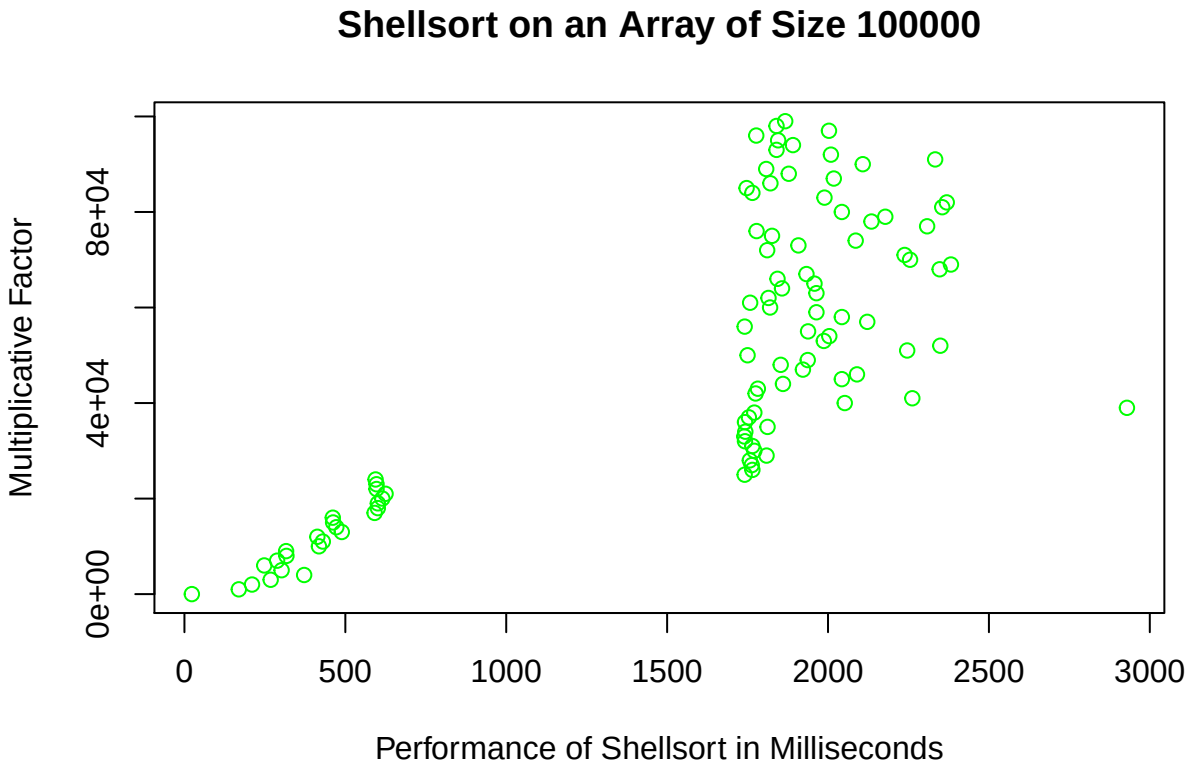



```
thresholdsLarger <- c(0, 100000, 200000, 300000, 400000, 500000, 600000, 700000, 800000, 900000)
sortTimesLarger <- c(146, 10492, 18444, 34210, 47092, 52021, 68512, 88227, 86242, 124046)
plot(sortTimesLarger, thresholdsLarger,
     xlab = "Performance of Quicksort in Milliseconds",
     ylab = "Possible Switch Points", col = "blue",
     main = "Quicksort on an Array of Size 100000")
```




```
listOfDifferences <- c(23, 169, 210, 268, 372, 302, 248, 288, 317, 316, 418,
                       430, 413, 489, 472, 462, 461, 591, 601, 601, 615, 625,
                       597, 597, 594, 1741, 1765, 1763, 1757, 1809, 1771,
                       1765, 1742, 1740, 1743, 1812, 1742, 1754, 1771, 2929,
                       2052, 2262, 1775, 1782, 1860, 2043, 2090, 1922, 1853,
                       1937, 1750, 2246, 2349, 1987, 2004, 1938, 1741, 2122,
                       2043, 1964, 1820, 1758, 1815, 1964, 1857, 1958, 1843,
                       1933, 2347, 2382, 2255, 2238, 1811, 1908, 2086, 1826,
                       1778, 2308, 2135, 2178, 2043, 2355, 2369, 1989, 1765,
                       1747, 1821, 2018, 1878, 1808, 2108, 2333, 2009, 1840,
                       1891, 1845, 1777, 2003, 1840, 1867)
listOfMultipliers <- c(2, 1002, 2002, 3002, 4002, 5002, 6002, 7002, 8002, 9002,
                       10002, 11002, 12002, 13002, 14002, 15002, 16002, 17002,
                       18002, 19002, 20002, 21002, 22002, 23002, 24002, 25002,
                       26002, 27002, 28002, 29002, 30002, 31002, 32002, 33002,
                       34002, 35002, 36002, 37002, 38002, 39002, 40002, 41002,
                       42002, 43002, 44002, 45002, 46002, 47002, 48002, 49002,
                       50002, 51002, 52002, 53002, 54002, 55002, 56002, 57002,
                       58002, 59002, 60002, 61002, 62002, 63002, 64002, 65002,
                       66002, 67002, 68002, 69002, 70002, 71002, 72002, 73002,
                       74002, 75002, 76002, 77002, 78002, 79002, 80002, 81002,
                       82002, 83002, 84002, 85002, 86002, 87002, 88002, 89002,
                       90002, 91002, 92002, 93002, 94002, 95002, 96002, 97002,
                       98002, 99002)
plot(listOfDifferences, listOfMultipliers,
     xlab = "Performance of Shellsort in Milliseconds",
```

```
    ylab = "Multiplicative Factor", col = "green",
    main = "Shellsort on an Array of Size 100000")
```



The time in milliseconds for a multipler of 2.25 is 15.