**Sprawozdanie  
„Symulowane wyżarzanie”**

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1. Testy

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| **Posortowany** vs nieposortowany | | | | | | | | |
|  | Posortowany | | | Nieposortowany | | | Średnia posortowany | Średnia nieposortowany |
| data | 891 | 857 | 829 | 872 | 829 | 832 | 859,00 | 844,33 |
| data1 | 10357 | 10387 | 10357 | 10745 | 10620 | 10834 | 10367,00 | 10733,00 |
| ta30 | 2307 | 2358 | 2335 | 2529 | 2476 | 2525 | 2333,33 | 2510,00 |
| ta50 | 3291 | 3329 | 3357 | 3480 | 3524 | 3482 | 3325,67 | 3495,33 |
| ta70 | 5431 | 5342 | 5354 | 5797 | 5835 | 5704 | 5375,67 | 5778,67 |
| Suma | | | | | | | 22260,67 | 23361,33 |

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| Swap vs **Insert** | | | | | | | | |
|  | Swap | | | Insert | | | Swap średnia | Insert średnia |
| data | 866 | 875 | 893 | 893 | 873 | 911 | 878,00 | 892,33 |
| data1 | 10414 | 10357 | 10379 | 10654 | 10428 | 10408 | 10383,33 | 10496,67 |
| ta30 | 2614 | 2489 | 2492 | 2387 | 2399 | 2320 | 2531,67 | 2368,67 |
| ta50 | 3526 | 3629 | 3348 | 3550 | 3324 | 3447 | 3501,00 | 3440,33 |
| ta70 | 5479 | 5478 | 5425 | 5424 | 5449 | 5468 | 5460,67 | 5447,00 |
| Suma | | | | | | | 22754,67 | 22645,00 |

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| **Swap** vs Insert różne prawdopodobieństwo | | | | | | | | | |
|  | Swap | | | Insert | | | Swap średnia | Insert średnia |
|  | 1 | 2 | 3 | 1 | 2 | 3 |
| data | 877 | 835 | 883 | 904 | 878 | 877 | 865,00 | 886,33 |
| data1 | 10403 | 10404 | 10371 | 10479 | 10481 | 10530 | 10392,67 | 10496,67 |
| ta30 | 2563 | 2388 | 2503 | 2392 | 2463 | 2425 | 2484,67 | 2426,67 |
| ta50 | 3394 | 3639 | 3331 | 3473 | 3352 | 3428 | 3454,67 | 3417,67 |
| ta70 | 5443 | 5453 | 5453 | 5539 | 5529 | 5423 | 5449,67 | 5497,00 |
| Suma | | | | | | | 22646,67 | 22724,33 | |

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| Swap vs **Insert** różny Cmax | | | | | | | | |
|  | Swap | | | Insert | | | Swap średnia | Insert średnia |
|  | 1 | 2 | 3 | 1 | 2 | 3 |
| data | 914 | 875 | 848 | 877 | 844 | 856 | 879,00 | 859,00 |
| data1 | 10597 | 10489 | 10418 | 10410 | 10409 | 10357 | 10501,33 | 10392,00 |
| ta30 | 2459 | 2387 | 2510 | 2376 | 2356 | 2527 | 2452,00 | 2419,67 |
| ta50 | 3320 | 3452 | 3399 | 3359 | 3314 | 3379 | 3390,33 | 3350,67 |
| ta70 | 5386 | 5436 | 5487 | 5408 | 5454 | 5386 | 5436,33 | 5416,00 |
| Suma | | | | | | | 22659,00 | 22437,33 |

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| Temperatura początkowa 50, **200**, 500, 1000 | | | | | | | | | | | | | | | | |
|  | 50 | | | 200 | | | 500 | | | 1000 | | | Średnia | | | |
|  | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 50,00 | 200,00 | 500,00 | 1000,00 |
| data | 872 | 829 | 832 | 847 | 805 | 852 | 893 | 840 | 892 | 885 | 944 | 893 | 844,33 | 834,67 | 875,00 | 907,33 |
| data1 | 10745 | 10620 | 10834 | 10758 | 10768 | 10654 | 10820 | 10873 | 10774 | 10979 | 10898 | 10808 | 10733,00 | 10726,67 | 10822,33 | 10895,00 |
| ta30 | 2529 | 2476 | 2525 | 2370 | 2505 | 2471 | 2450 | 2585 | 2426 | 2611 | 2454 | 2556 | 2510,00 | 2448,67 | 2487,00 | 2540,33 |
| ta50 | 3480 | 3524 | 3482 | 3503 | 3598 | 3561 | 3610 | 3599 | 3636 | 3546 | 3619 | 3568 | 3495,33 | 3554,00 | 3615,00 | 3577,67 |
| ta70 | 5797 | 5835 | 5704 | 5747 | 5724 | 5723 | 5944 | 5774 | 5824 | 6014 | 6056 | 5900 | 5778,67 | 5731,33 | 5847,33 | 5990,00 |
| Suma | | | | | | | | | | | | | 23361,33 | 23295,33 | 23646,67 | 23910,33 |

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| Współczynniki wychładzania 0,8 **0,9** 0,95 0,99 | | | | | | | | | | | | | | | | | | | | | | |
|  | 0,8 | | | 0,9 | | | 0,95 | | | | 0,99 | | | | Średnia | | | | | | | |
| 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | | 2 | 3 | 0,8 | | 0,9 | | 0,95 | | 0,99 | |
| data | 877 | 834 | 872 | 872 | 829 | 832 | 878 | 893 | 859 | 948 | | 877 | 934 | 861,00 | | 844,33 | | 876,67 | | 919,67 | |
| data1 | 10758 | 10707 | 10896 | 10745 | 10620 | 10834 | 10766 | 10604 | 10749 | 10916 | | 10852 | 10782 | 10787,00 | | 10733,00 | | 10706,33 | | 10850,00 | |
| ta30 | 2501 | 2474 | 2473 | 2529 | 2476 | 2525 | 2437 | 2548 | 2408 | 2559 | | 2600 | 2635 | 2482,67 | | 2510,00 | | 2464,33 | | 2598,00 | |
| ta50 | 3598 | 3515 | 3554 | 3480 | 3524 | 3482 | 3455 | 3523 | 3614 | 3748 | | 3684 | 3582 | 3555,67 | | 3495,33 | | 3530,67 | | 3671,33 | |
| ta70 | 5710 | 5804 | 5831 | 5797 | 5835 | 5704 | 5752 | 5839 | 5827 | 5899 | | 6066 | 5674 | 5781,67 | | 5778,67 | | 5806,00 | | 5879,67 | |
| Suma | | | | | | | | | | | | | | | 23468,00 | | 23361,33 | | 23384,00 | | 23918,67 | |

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| Temperatura końcowa 5, 10, 50, **100** | | | | | | | | | | | | | | | | |
|  | 5 | | | 10 | | | 50 | | | 100 | | | Średnia | | | |
|  | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 5 | 10 | 50 | 100 |
| data | 850 | 877 | 872 | 878 | 876 | 845 | 887 | 942 | 893 | 925 | 928 | 829 | 884,50 | 866,33 | 907,33 | 894,00 |
| data1 | 10429 | 10425 | 10393 | 10379 | 10408 | 10420 | 10570 | 10491 | 10358 | 10376 | 10545 | 10357 | 10424,90 | 10402,33 | 10473,00 | 10426,00 |
| ta30 | 2426 | 2625 | 2476 | 2469 | 2477 | 2376 | 2400 | 2352 | 2549 | 2376 | 2449 | 2496 | 2474,83 | 2440,67 | 2433,67 | 2440,33 |
| ta50 | 3422 | 3420 | 3360 | 3487 | 3485 | 3516 | 3541 | 3500 | 3382 | 3397 | 3328 | 3350 | 3400,67 | 3496,00 | 3474,33 | 3358,33 |
| ta70 | 5393 | 5429 | 5492 | 5539 | 5640 | 5601 | 5387 | 5490 | 5596 | 5424 | 5484 | 5387 | 5497,29 | 5593,33 | 5491,00 | 5431,67 |
| Suma | | | | | | | | | | | | | 22682,19 | 22798,67 | 22779,33 | 22550,33 |

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| NEH vs Wyżarzanie insert, różny cmax, współczynnik wychładzania 0.9, sortowany, temperatura początkowa 200 temperatura końcowa 5 | | | | | | | |
|  | NEH | Wyżarzanie | | | NEH średnia | Wyżarzanie średnia |
| data | 829 | 879 | 839 | 893 | 829,00 | 870,33 |
| data1 | 10357 | 10357 | 10420 | 10371 | 10357,00 | 10382,67 |
| ta30 | 2277 | 2545 | 2419 | 2484 | 2277,00 | 2482,67 |
| ta50 | 3257 | 3462 | 3385 | 3528 | 3257,00 | 3458,33 |
| ta70 | 5342 | 5466 | 5457 | 5349 | 5342,00 | 5424,00 |
| Suma | | | | | 22062,00 | 22618,00 | |

1. Wnioski

Z naszych obserwacji wynika że algorytm najlepiej działa gdy kolejność początkowa już jest posortowana za pomocą NEHa. Najlepsza temperatura początkowa to 200 stopni a końcowa 100. Najlepszym współczynnikiem wychładzania jest 0.9. A najlepszym ruchem jest ruch typu insert. Choć w tym przypadku dane nie są jednoznaczne i zależne od innych parametrów. Nie udało nam się dobrać parametrów tak aby algorytm spisywał się lepiej niż NEH. W kilku pojedynczych przypadkach osiągnęliśmy ten sam lub zbliżony wynik.