**R03941072 王品賀**

**Algorithm programming Assignment #1 Report**

**1.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test**  **Case** | **Insertion Sort** | | **Merge Sort** | | **Heap Sort** | | **Quick Sort** | |
| **Time**  **(Sec)** | **Memory**  **(MB)** | **Time**  **(Sec)** | **Memory**  **(MB)** | **Time**  **(Sec)** | **Memory**  **(MB)** | **Time**  **(Sec)** | **Memory**  **(MB)** |
| **Case1** | 0.059548 | 0.492 | 0.006607 | 0.58 | 0.008249 | 0.452 | 0.007787 | 0.468 |
| **Case2** | 2.33881 | 1.52 | 0.052578 | 1.704 | 0.064718 | 1.188 | 0.058247 | 1.184 |
| **Case3** | 160.938 | 12 | 0.45835 | 9.816 | 0.541224 | 7.092 | 0.432637 | 7.080 |
| **Case4** | 874.509 | 27 | 1.09407 | 14 | 1.28765 | 15 | 1.07256 | 14 |

**2.**

**CPU Time vs. problem size –**

Insertion Sort 的時間複雜度：**O(n2)**

**Zoom in**

Merge Sort / Heap Sort / Quick Sort 用poly. 曲線來fit，可以發現他們的二次項非常小，可以忽略看成Linear。

時間複雜度：**O(n)**

**Memory vs. problem size –**

四個算法的空間複雜度：**O(n)**