



ANALISIS KOMPLEKSITAS ALGORITMA BUBBLE SORT DAN MERGE SORT

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A. Pengertian dan Pseudocode

1. Bubble Sort

BubbleSort(array)

```
    for i=length(array)-1 downto 0 do
    for j=1 to i do
        if array[j-1] > array[j] then
            swap(array[j-1],array[j])
        end if
    end for
    end for
```

A. Pengertian dan Pseudocode

2. Merge Sort

MergeSort(array,low,high)

mid : integer

if (low<high) **then**

mid <- (low+high)/2

MergeSort(array,low,mid)

MergeSort(array,mid+1,high)

Merge(array,low,high,mid)

endif

B. $C(n)$, $T(n)$, Kelas Efisiensi

1. Bubble Sort

$$T(n) \in O(n^2)$$

$$C(n) = c_{op}n^2$$

Kelas efisiensi Kuadratik

2. Merge Sort

$$T(n) \in O(n \log n)$$

$$C(n) = c_{op}n \log n$$

Kelas efisiensi Logaritmik

C. Contoh dan Ilustrasi

1. Bubble Sort

Pada $i=7$

Tukar

j=1	4	2	14	7	32	55	10	21
-----	---	---	----	---	----	----	----	----

Tidak Tukar

j=2	2	4	14	7	32	55	10	21
-----	---	---	----	---	----	----	----	----

Tukar

j=3	2	4	14	7	32	55	10	21
-----	---	---	----	---	----	----	----	----

Tidak Tukar

j=4	2	4	7	14	32	55	10	21
-----	---	---	---	----	----	----	----	----

Tidak Tukar

j=5	2	4	7	14	32	55	10	21
-----	---	---	---	----	----	----	----	----

Tukar

j=6	2	4	7	14	32	55	10	21
-----	---	---	---	----	----	----	----	----

Tukar

j=7	2	4	7	14	32	10	55	21
-----	---	---	---	----	----	----	----	----

Kondisi Akhir

2	4	7	14	32	10	21	55
---	---	---	----	----	----	----	----

C. Contoh dan Ilustrasi

pada $i=6$

Tidak Tukar

$j=1$

2	4	7	14	32	10	21	55
---	---	---	----	----	----	----	----

Tidak Tukar

$j=2$

2	4	7	14	32	10	21	55
---	---	---	----	----	----	----	----

Tidak Tukar

$j=3$

2	4	7	14	32	10	21	55
---	---	---	----	----	----	----	----

Tidak Tukar

$j=4$

2	4	7	14	32	10	21	55
---	---	---	----	----	----	----	----

Tukar

$j=5$

2	4	7	14	32	10	21	55
---	---	---	----	----	----	----	----

Tukar

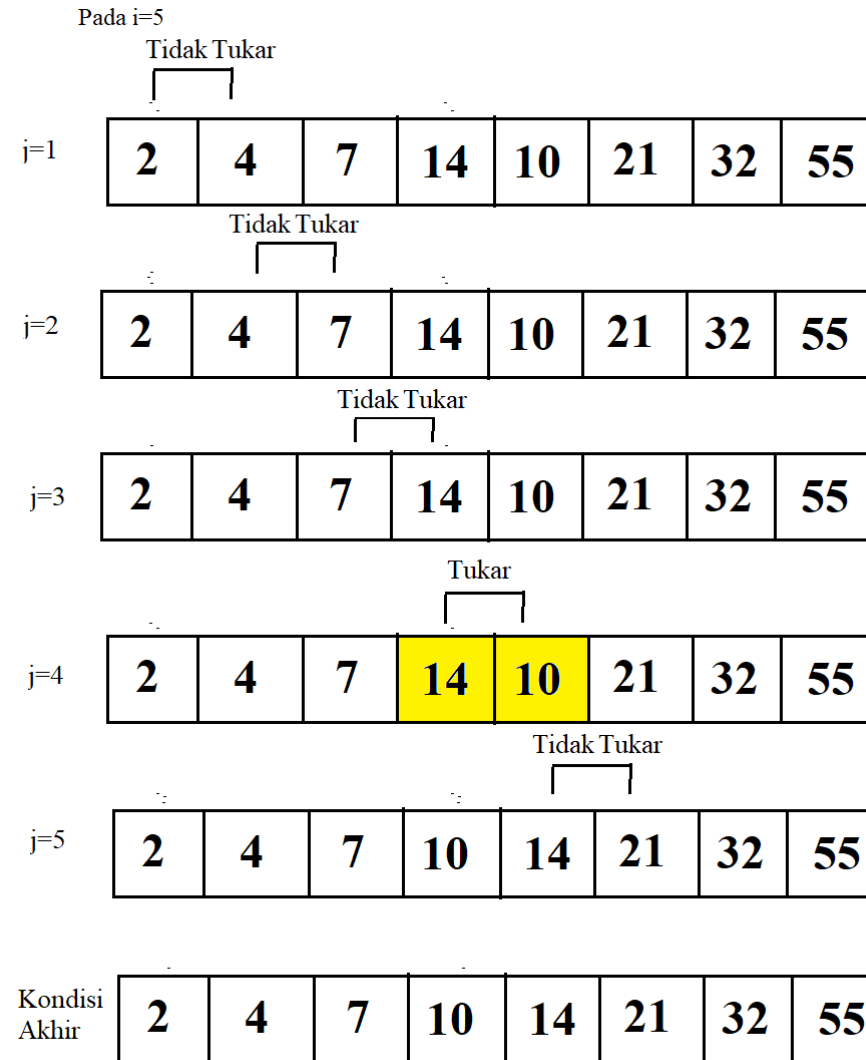
$j=6$

2	4	7	14	10	32	21	55
---	---	---	----	----	----	----	----

Kondisi Akhir

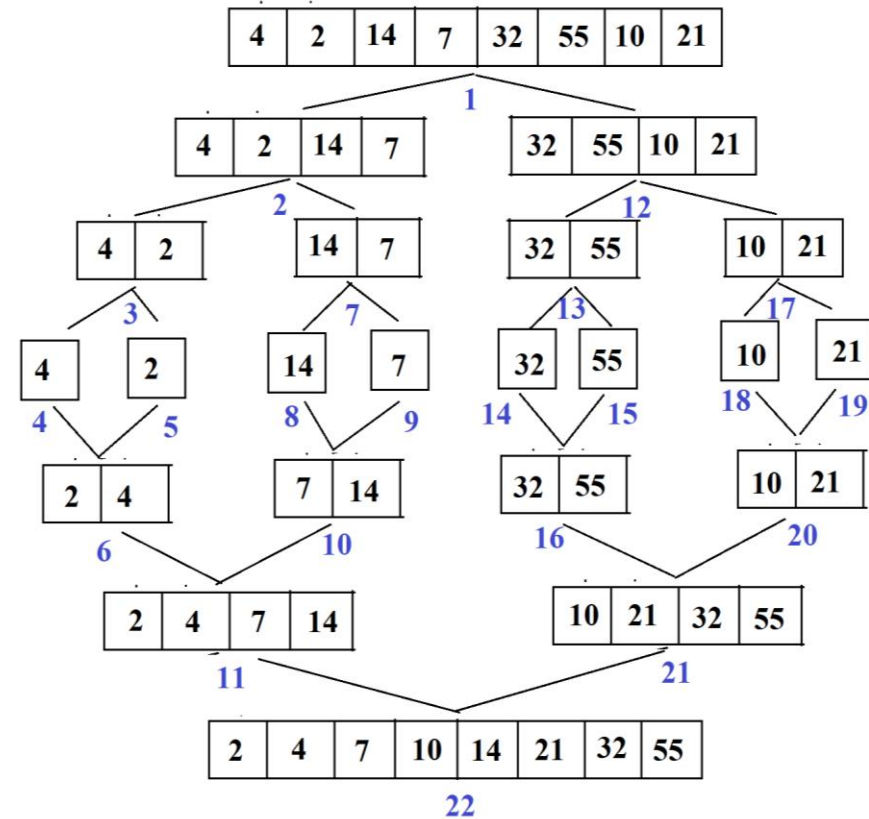
2	4	7	14	10	21	32	55
---	---	---	----	----	----	----	----

C. Contoh dan Ilustrasi



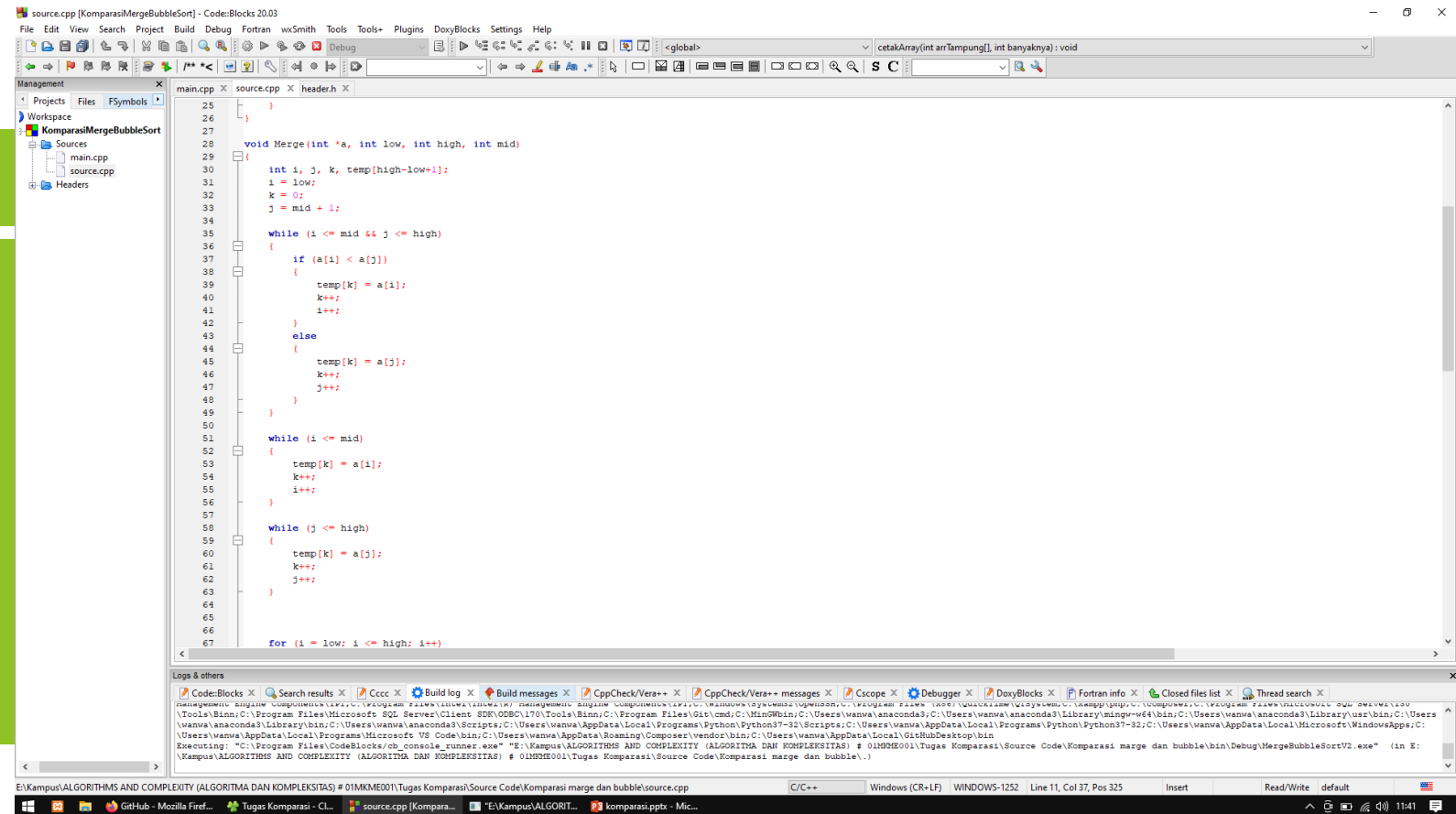
2. Merge Sort

C. Contoh dan Ilustrasi



D. Source

Nanti Akan ditampilkan langsung

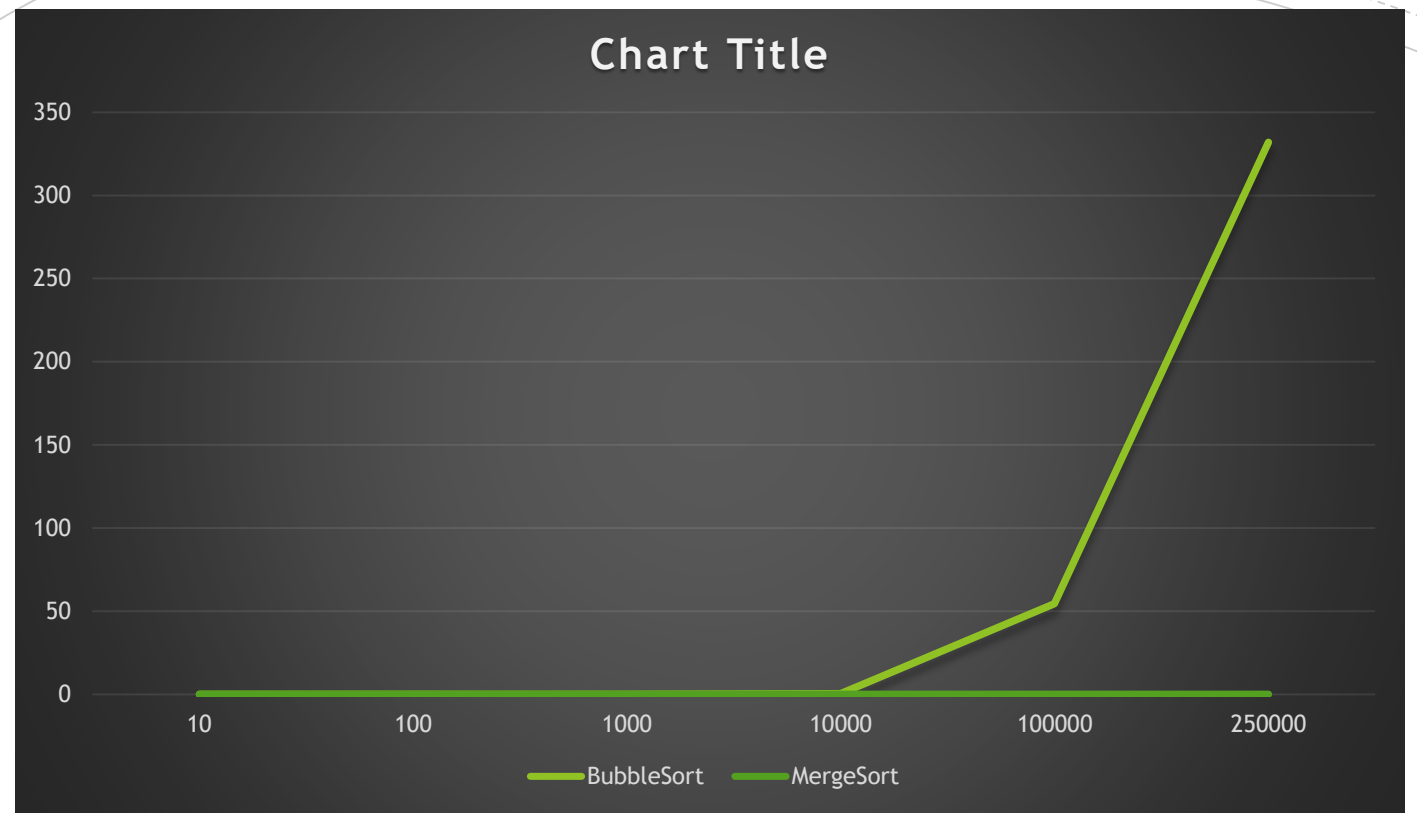


The screenshot shows a C++ IDE with a project named 'KomparasiMergeBubbleSort'. The main.cpp file contains the following code:

```
25 }
26 }
27
28 void Merge(int *a, int low, int high, int mid)
29 {
30     int i, j, k, temp[high-low+1];
31     i = low;
32     k = 0;
33     j = mid + 1;
34
35     while (i <= mid && j <= high)
36     {
37         if (a[i] < a[j])
38         {
39             temp[k] = a[i];
40             k++;
41             i++;
42         }
43         else
44         {
45             temp[k] = a[j];
46             k++;
47             j++;
48         }
49     }
50
51     while (i <= mid)
52     {
53         temp[k] = a[i];
54         k++;
55         i++;
56     }
57
58     while (j <= high)
59     {
60         temp[k] = a[j];
61         k++;
62         j++;
63     }
64
65     for (i = low; i <= high; i++)
```

The IDE interface includes a menu bar (File, Edit, View, Search, Project, Build, Debug, Fortran, wxSmith, Tools, Tools+, Plugins, DoxyBlocks, Settings, Help), a toolbar, and a sidebar with 'Management' (Projects, Files, FSymbols) and 'Workspace' (Sources, main.cpp, source.cpp, Headers). The bottom status bar shows the file path 'E:\Kampus\ALGORITHMS AND COMPLEXITY (ALGORITMA DAN KOMPLEKSITAS) # 01MKME001\Tugas Komparasi\Source Code\Komparasi marge dan bubble\source.cpp' and the status 'C/C++ Windows (CR+LF) WINDOWS-1252 Line 11, Col 37, Pos 325 Insert Read/Write default'.

E. Tabel dan Grafik



Input (n)	10	100	1000	10000	100000	250000
BubbleSort	0	0	0.015	0.527	54.457	332
MergeSort	0	0	0	0	0.033	0.078

F. VISUALISASI

Nanti Akan ditampilkan
langsung

F. VISUALISASI

Nanti Akan ditampilkan
langsung

The screenshot displays a C++ IDE with the following components:

- Source Code (main.cpp):**

```

70     }
71 }
72
73
74 void mergeSort(int *a, int low, int high)
75 {
76     int mid;
77     if (low < high)
78     {
79         mid=(low+high)/2;
80         mergeSort(a, low, mid);
81         mergeSort(a, mid+1, high);
82         Merge(a, low, high, mid);
83     }
84 }
85
86
87 void menuAwal() {
88     cout << "[OLEH : MISHAN, DUTA ARIEF S, DENI
89     cout << "=====52 TI UNPA=====
90     cout << "KOMPARASI BUBBLE SORT DAN MERGE SORT
91     cout << "Masukan Input Beban/Array : ";
92 }
93
94 void menuUtama() {
95     cout << "KOMPLEKSITAS BUBBLE SORT AND MERGE
96     cout << "Pilih Menu yang sesuai : " << endl;
97     cout << "1. Tampilkan Array/Beban" << endl;
98     cout << "2. Bubble Sort" << endl;
99     cout << "3. Merge Sort" << endl;
100    cout << "4. Reset isi Array" << endl;
101    cout << "9. Keluar dari program" << endl;
102    cout << "Pilihlah Anda : ";
103 }
104
105 void menuPilihan(int pilihan, int arrTampung[], int Banyaknya) {
106     switch (pilihan) {
107     case 1:
108         cetakArray(arrTampung, banyaknya);
109         break;
110     case 2:
111         auto t1 = chrono::high_resolution_clock::now();
112         bubbleSort(arrTampung, banyaknya);
113         auto t2 = chrono::high_resolution_clock::now();
114     }
115 }

```
- Output Window:**

```

[OLEH : MISHAN, DUTA ARIEF S, DENI WARSA S, MAKHUM ]
=====52 TI UNPA=====
KOMPARASI BUBBLE SORT DAN MERGE SORT
Masukan Input Beban/Array :

```
- Taskbar:** Shows the Windows taskbar with the taskbar icon, taskbar buttons, and the taskbar menu.