

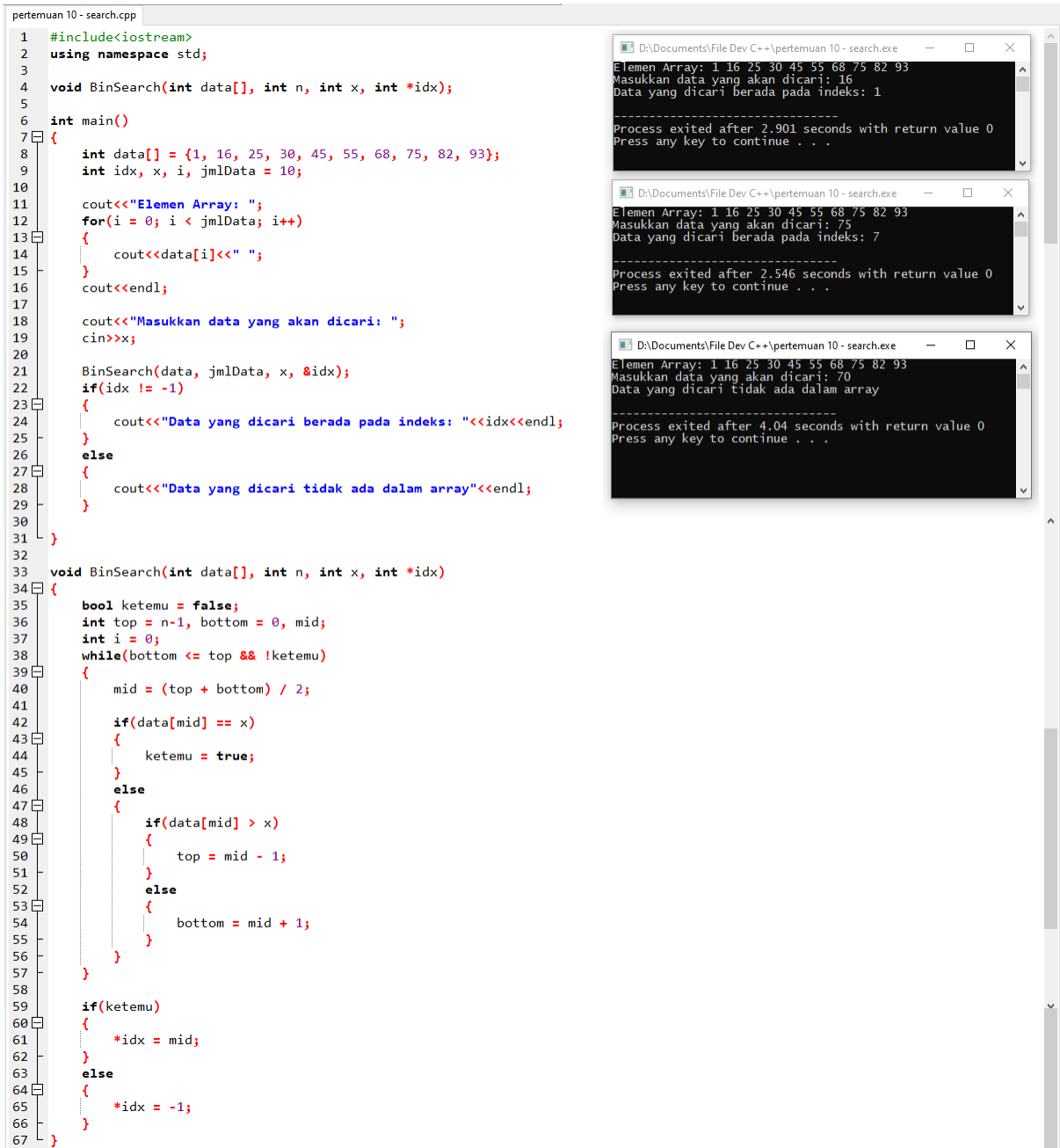
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Kelas : 02TPLP023

Tugas : Algoritma II – Pertemuan 10

1.



The image shows a C++ program for binary search and three screenshots of its execution. The program is named 'pertemuan 10 - search.cpp' and is located at 'D:\Documents\File Dev C++\pertemuan 10 - search.exe'.

**Program Code:**

```
1 #include<iostream>
2 using namespace std;
3
4 void BinSearch(int data[], int n, int x, int *idx);
5
6 int main()
7 {
8     int data[] = {1, 16, 25, 30, 45, 55, 68, 75, 82, 93};
9     int idx, x, i, jmlData = 10;
10
11     cout<<"Elemen Array: ";
12     for(i = 0; i < jmlData; i++)
13     {
14         cout<<data[i]<<" ";
15     }
16     cout<<endl;
17
18     cout<<"Masukkan data yang akan dicari: ";
19     cin>>x;
20
21     BinSearch(data, jmlData, x, &idx);
22     if(idx != -1)
23     {
24         cout<<"Data yang dicari berada pada indeks: "<<idx<<endl;
25     }
26     else
27     {
28         cout<<"Data yang dicari tidak ada dalam array"<<endl;
29     }
30 }
31
32 void BinSearch(int data[], int n, int x, int *idx)
33 {
34     bool ketemu = false;
35     int top = n-1, bottom = 0, mid;
36     int i = 0;
37     while(bottom <= top && !ketemu)
38     {
39         mid = (top + bottom) / 2;
40
41         if(data[mid] == x)
42         {
43             ketemu = true;
44         }
45         else
46         {
47             if(data[mid] > x)
48             {
49                 top = mid - 1;
50             }
51             else
52             {
53                 bottom = mid + 1;
54             }
55         }
56     }
57
58     if(ketemu)
59     {
60         *idx = mid;
61     }
62     else
63     {
64         *idx = -1;
65     }
66 }
67 }
```

**Execution Results:**

Three screenshots of the program's output are shown:

- First Screenshot:** The array is displayed as "Elemen Array: 1 16 25 30 45 55 68 75 82 93". The user enters "16". The output is "Data yang dicari berada pada indeks: 1". The process exits after 2.901 seconds.
- Second Screenshot:** The array is displayed as "Elemen Array: 1 16 25 30 45 55 68 75 82 93". The user enters "75". The output is "Data yang dicari berada pada indeks: 7". The process exits after 2.546 seconds.
- Third Screenshot:** The array is displayed as "Elemen Array: 1 16 25 30 45 55 68 75 82 93". The user enters "70". The output is "Data yang dicari tidak ada dalam array". The process exits after 4.04 seconds.

Source code:

```
#include<iostream>
using namespace std;

void BinSearch(int data[], int n, int x, int *idx);

int main()
{
    int data[] = {1, 16, 25, 30, 45, 55, 68, 75, 82, 93};
    int idx, x, i, jmlData = 10;

    cout<<"Elemen Array: ";
    for(i = 0; i < jmlData; i++)
    {
        cout<<data[i]<<" ";
    }
    cout<<endl;

    cout<<"Masukkan data yang akan dicari: ";
    cin>>x;

    BinSearch(data, jmlData, x, &idx);
    if(idx != -1)
    {
        cout<<"Data yang dicari berada pada indeks: "<<idx<<endl;
    }
    else
    {
        cout<<"Data yang dicari tidak ada dalam array"<<endl;
    }
}

void BinSearch(int data[], int n, int x, int *idx)
{
    bool ketemu = false;
    int top = n-1, bottom = 0, mid;
    int i = 0;
    while(bottom <= top && !ketemu)
    {
        mid = (top + bottom) / 2;

        if(data[mid] == x)
        {
            ketemu = true;
        }
        else
        {
            if(data[mid] > x)
            {
                top = mid - 1;
            }
            else
            {
                bottom = mid + 1;
            }
        }
    }
}
```

```

        if(ketemu)
        {
            *idx = mid;
        }
        else
        {
            *idx = -1;
        }
    }
}

```

2.

pertemuan 10 - no. 2.cpp

```

1  #include<iostream>
2  using namespace std;
3
4  void BinSearch(int data[], int n, int x, int *idx);
5
6  int main()
7  {
8      int data[] = {23, 26, 30, 50, 55, 65, 69, 78, 80, 90};
9      int idx, x, i, jmlData = 10;
10
11      cout<<"Elemen Array: ";
12      for(i = 0; i < jmlData; i++)
13      {
14          cout<<data[i]<<" ";
15      }
16      cout<<endl;
17
18      cout<<"Masukkan data yang akan dicari: ";
19      cin>>x;
20
21      BinSearch(data, jmlData, x, &idx);
22      if(idx != -1)
23      {
24          cout<<"Data yang dicari berada pada indeks: "<<idx<<endl;
25      }
26      else
27      {
28          cout<<"Data yang dicari tidak ada dalam array"<<endl;
29      }
30
31  }
32
33  void BinSearch(int data[], int n, int x, int *idx)
34  {
35      bool ketemu = false;
36      int top = n-1, bottom = 0, mid;
37      int i = 0;
38      while(bottom <= top && !ketemu)
39      {
40          mid = (top + bottom) / 2;
41
42          if(data[mid] == x)
43          {
44              ketemu = true;
45          }
46          else
47          {
48              if(data[mid] > x)
49              {
50                  top = mid - 1;
51              }
52              else
53              {
54                  bottom = mid + 1;
55              }
56          }
57      }
58
59      if(ketemu)
60      {
61          *idx = mid;
62      }
63      else
64      {
65          *idx = -1;
66      }
67  }

```

D:\Documents\File Dev C++\pertemuan 10 - no. 2.exe

```

Elemen Array: 23 26 30 50 55 65 69 78 80 90
Masukkan data yang akan dicari: 23
Data yang dicari berada pada indeks: 0
-----
Process exited after 0.7526 seconds with return value 0
Press any key to continue . . .

```

D:\Documents\File Dev C++\pertemuan 10 - no. 2.exe

```

Elemen Array: 23 26 30 50 55 65 69 78 80 90
Masukkan data yang akan dicari: 69
Data yang dicari berada pada indeks: 6
-----
Process exited after 1.956 seconds with return value 0
Press any key to continue . . .

```

D:\Documents\File Dev C++\pertemuan 10 - no. 2.exe

```

Elemen Array: 23 26 30 50 55 65 69 78 80 90
Masukkan data yang akan dicari: 88
Data yang dicari tidak ada dalam array
-----
Process exited after 1.922 seconds with return value 0
Press any key to continue . . .

```

### Source Code:

```
#include<iostream>
using namespace std;

void BinSearch(int data[], int n, int x, int *idx);

int main()
{
    int data[] = {23, 26, 30, 50, 55, 65, 69, 78, 80, 90};
    int idx, x, i, jmlData = 10;

    cout<<"Elemen Array: ";
    for(i = 0; i < jmlData; i++)
    {
        cout<<data[i]<<" ";
    }
    cout<<endl;

    cout<<"Masukkan data yang akan dicari: ";
    cin>>x;

    BinSearch(data, jmlData, x, &idx);
    if(idx != -1)
    {
        cout<<"Data yang dicari berada pada indeks: "<<idx<<endl;
    }
    else
    {
        cout<<"Data yang dicari tidak ada dalam array"<<endl;
    }
}

void BinSearch(int data[], int n, int x, int *idx)
{
    bool ketemu = false;
    int top = n-1, bottom = 0, mid;
    int i = 0;
    while(bottom <= top && !ketemu)
    {
```

```

mid = (top + bottom) / 2;

if(data[mid] == x)
{
    ketemu = true;
}
else
{
    if(data[mid] > x)
    {
        top = mid - 1;
    }
    else
    {
        bottom = mid + 1;
    }
}

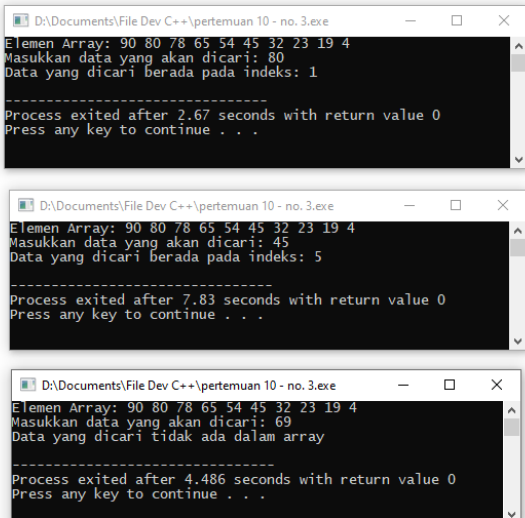
}

if(ketemu)
{
    *idx = mid;
}
else
{
    *idx = -1;
}
}

```

3.

```
pertemuan 10 - no. 3.cpp
1 #include<iostream>
2 using namespace std;
3
4 void BinSearch(int data[], int n, int x, int *idx);
5
6 int main()
7 {
8     int data[] = {90, 80, 78, 65, 54, 45, 32, 23, 19, 4};
9     int idx, x, i, jmlData = 10;
10
11     cout<<"Elemen Array: ";
12     for(i = 0; i < jmlData; i++)
13     {
14         cout<<data[i]<<" ";
15     }
16     cout<<endl;
17
18     cout<<"Masukkan data yang akan dicari: ";
19     cin>>x;
20
21     BinSearch(data, jmlData, x, &idx);
22     if(idx != -1)
23     {
24         cout<<"Data yang dicari berada pada indeks: "<<idx<<endl;
25     }
26     else
27     {
28         cout<<"Data yang dicari tidak ada dalam array"<<endl;
29     }
30 }
31
32
33 void BinSearch(int data[], int n, int x, int *idx)
34 {
35     bool ketemu = false;
36     int top = n-1, bottom = 0, mid;
37     int i = 0;
38     while(bottom <= top && !ketemu)
39     {
40         mid = (top + bottom) / 2;
41
42         if(data[mid] == x)
43         {
44             ketemu = true;
45         }
46         else
47         {
48             if(data[mid] < x)
49             {
50                 top = mid - 1;
51             }
52             else
53             {
54                 bottom = mid + 1;
55             }
56         }
57     }
58
59     if(ketemu)
60     {
61         *idx = mid;
62     }
63     else
64     {
65         *idx = -1;
66     }
67 }
```



Execution 1:  
Elemen Array: 90 80 78 65 54 45 32 23 19 4  
Masukkan data yang akan dicari: 80  
Data yang dicari berada pada indeks: 1  
Process exited after 2.67 seconds with return value 0  
Press any key to continue . . .

Execution 2:  
Elemen Array: 90 80 78 65 54 45 32 23 19 4  
Masukkan data yang akan dicari: 45  
Data yang dicari berada pada indeks: 5  
Process exited after 7.83 seconds with return value 0  
Press any key to continue . . .

Execution 3:  
Elemen Array: 90 80 78 65 54 45 32 23 19 4  
Masukkan data yang akan dicari: 69  
Data yang dicari tidak ada dalam array  
Process exited after 4.486 seconds with return value 0  
Press any key to continue . . .

## Source Code:

```
#include<iostream>
using namespace std;

void BinSearch(int data[], int n, int x, int *idx);

int main()
{
    int data[] = {90, 80, 78, 65, 54, 45, 32, 23, 19, 4};
    int idx, x, i, jmlData = 10;

    cout<<"Elemen Array: ";
    for(i = 0; i < jmlData; i++)
    {
        cout<<data[i]<<" ";
    }
    cout<<endl;

    cout<<"Masukkan data yang akan dicari: ";
    cin>>x;

    BinSearch(data, jmlData, x, &idx);
    if(idx != -1)
    {
        cout<<"Data yang dicari berada pada indeks: "<<idx<<endl;
    }
    else
    {
        cout<<"Data yang dicari tidak ada dalam array"<<endl;
    }
}

void BinSearch(int data[], int n, int x, int *idx)
{
```

```

bool ketemu = false;
int top = n-1, bottom = 0, mid;
int i = 0;
while(bottom <= top && !ketemu)
{
    mid = (top + bottom) / 2;

    if(data[mid] == x)
    {
        ketemu = true;
    }
    else
    {
        if(data[mid] < x)
        {
            top = mid - 1;
        }
        else
        {
            bottom = mid + 1;
        }
    }
}

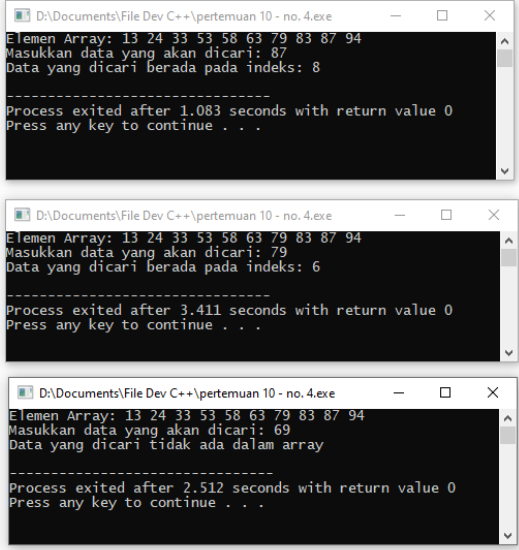
if(ketemu)
{
    *idx = mid;
}
else
{
    *idx = -1;
}
}

```



4.

```
pertemuan 10 - no. 4.cpp
1 #include<iostream>
2 using namespace std;
3
4 void BinSearch(int data[], int n, int x, int *idx);
5
6 int main()
7 {
8     int data[] = {13, 24, 33, 53, 58, 63, 79, 83, 87, 94};
9     int idx, x, i, jmlData = 10;
10
11     cout<<"Elemen Array: ";
12     for(i = 0; i < jmlData; i++)
13     {
14         cout<<data[i]<<" ";
15     }
16     cout<<endl;
17
18     cout<<"Masukkan data yang akan dicari: ";
19     cin>>x;
20
21     BinSearch(data, jmlData, x, &idx);
22     if(idx != -1)
23     {
24         cout<<"Data yang dicari berada pada indeks: "<<idx<<endl;
25     }
26     else
27     {
28         cout<<"Data yang dicari tidak ada dalam array"<<endl;
29     }
30 }
31
32
33 void BinSearch(int data[], int n, int x, int *idx)
34 {
35     bool ketemu = false;
36     int top = n-1, bottom = 0, mid;
37     int i = 0;
38     while(bottom <= top && !ketemu)
39     {
40         mid = (top + bottom) / 2;
41
42         if(data[mid] == x)
43         {
44             ketemu = true;
45         }
46         else
47         {
48             if(data[mid] > x)
49             {
50                 top = mid - 1;
51             }
52             else
53             {
54                 bottom = mid + 1;
55             }
56         }
57     }
58
59     if(ketemu)
60     {
61         *idx = mid;
62     }
63     else
64     {
65         *idx = -1;
66     }
67 }
```



The image shows three screenshots of the program's execution output in a Windows console window. Each screenshot displays the array elements, the input value, and the search result.

First screenshot: The array is 13 24 33 53 58 63 79 83 87 94. The input is 87. The output is "Data yang dicari berada pada indeks: 8".

Second screenshot: The array is 13 24 33 53 58 63 79 83 87 94. The input is 79. The output is "Data yang dicari berada pada indeks: 6".

Third screenshot: The array is 13 24 33 53 58 63 79 83 87 94. The input is 69. The output is "Data yang dicari tidak ada dalam array".

### Source Code:

```
#include<iostream>

using namespace std;

void BinSearch(int data[], int n, int x, int *idx);

int main()
{
    int data[] = {13, 24, 33, 53, 58, 63, 79, 83, 87, 94};
    int idx, x, i, jmlData = 10;

    cout<<"Elemen Array: ";
    for(i = 0; i < jmlData; i++)
    {
        cout<<data[i]<<" ";
    }
    cout<<endl;

    cout<<"Masukkan data yang akan dicari: ";
    cin>>x;

    BinSearch(data, jmlData, x, &idx);
    if(idx != -1)
    {
        cout<<"Data yang dicari berada pada indeks: "<<idx<<endl;
    }
    else
    {
        cout<<"Data yang dicari tidak ada dalam array"<<endl;
    }
}

void BinSearch(int data[], int n, int x, int *idx)
{
```

```

bool ketemu = false;
int top = n-1, bottom = 0, mid;
int i = 0;
while(bottom <= top && !ketemu)
{
    mid = (top + bottom) / 2;

    if(data[mid] == x)
    {
        ketemu = true;
    }
    else
    {
        if(data[mid] > x)
        {
            top = mid - 1;
        }
        else
        {
            bottom = mid + 1;
        }
    }
}

if(ketemu)
{
    *idx = mid;
}
else
{
    *idx = -1;
}
}

```