|  |  |  |  |
| --- | --- | --- | --- |
| Pos | RollNo | Name | Per |
| 0 | 2 | Sunil | 67.77 |
| 1 | 5 | Harish | 80.22 |
| 2 | 9 | Geeta | 77.33 |
| 3 | 13 | Vidya | 80.00 |
| 4 | 14 | Mahesh | 76.66 |
| 5 | 22 | Kamlesh | 90.00 |
| 6 | 25 | Samir | 74.00 |
| 7 | 30 | Ramesh | 60.33 |

Records of Pass Students

top

mid

top

mid

mid

bottom

nor = 8

To search rno = 25, by linear search, we will require 7 no of comparisons

Let us now see by binary search how many comparisons will be required

top = 0, bottom = nor – 1 = 8 – 1 = 7

mid = (top + bottom) / 2 = (0+7)/2 = 7/2 = 3 (operation between 2 int values will produce

int result only)

if (rno == recs[mid].rollno)

if (25 == 13), F, 25 > 13, Ignore top half. top = mid + 1 = 3 + 1 = 4

mid = (top+bottom)/2 = (4+7)/2 = 11/2 = 5

if (25 == 22), F, 25 > 22, Ignore top half (searach bottom half). top = mid+1 = 5+1 = 6

if (25 == 25), T Search terminates. No of comparions = 3 < 7 of linear search

rno = 35, Let’s see how the search will terminate

1st 2 cases will be same for rno = 35

if (35 == 25), F, 35 > 25, Search bottom half. top = mid + 1 = 6+1 = 7

mid = (7+7)/2 = 14/2 = 7

if (35 == 30), F, 35 > 30, Search bottom half. top = mid + 1 = 7+1 = 8

bottom is @ pos 7 whereas top is @ pos 8. Search has to terminate bcoz top > bottom

Search loop is while (top <= bottom)

top

mid

bottom

mid

bottom

|  |  |  |  |
| --- | --- | --- | --- |
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| 5 | 22 | Kamlesh | 90.00 |
| 6 | 25 | Samir | 74.00 |
| 7 | 30 | Ramesh | 60.33 |

To prove that binary search is equally effective (good) in upper half

rno = 5, top = 0, bottom = 7

mid = (top+bottom)/2 = (0+7)/2 = 3

if (5 == 13), F, 5 < 13, Search upper half (ignore lower half) bottom = mid-1 = 3-1 = 2

mid = (0+2) / 2 = 2/2 = 1

if (5 == 5), T, Search terminates. No of comparisons = 2. By linear search, No of comparisons=2

So binary search is equally good (performance wise) in upper half

rno = 1

if (1 == 5), F, 1 < 5. Search upper half. bottom = mid – 1 = 1 – 1 = 0

mid = (top+bottom) / 2 = (0 + 0)/2 = 0

if (1 == 2), F, 1 < 2. Search upper half. bottom = mid – 1 = 0 – 1 = -1

top = 0, bottom = -1. How can bottom be less that top?

Always remember that left & right OR top & bottom should never cross.

while (top <= bottom)

If top is greater than bottom OR bottom is less than top, search should terminate.

HW – Search for rno = 14

Send photo of NB

|  |  |  |  |
| --- | --- | --- | --- |
| Pos | RollNo | Name | Per |
| 0 | 2 | Sunil | 67.77 |
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| 2 | 9 | Geeta | 77.33 |
| 3 | 13 | Vidya | 80.00 |
| 4 | 14 | Mahesh | 76.66 |
| 5 | 22 | Kamlesh | 90.00 |
| 6 | 25 | Samir | 74.00 |
| 7 | 30 | Ramesh | 60.33 |