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- 50th percentile = **median**
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In terms of the histogram of scores:

the total area to the left of this score was 95%.

Cumulative sums

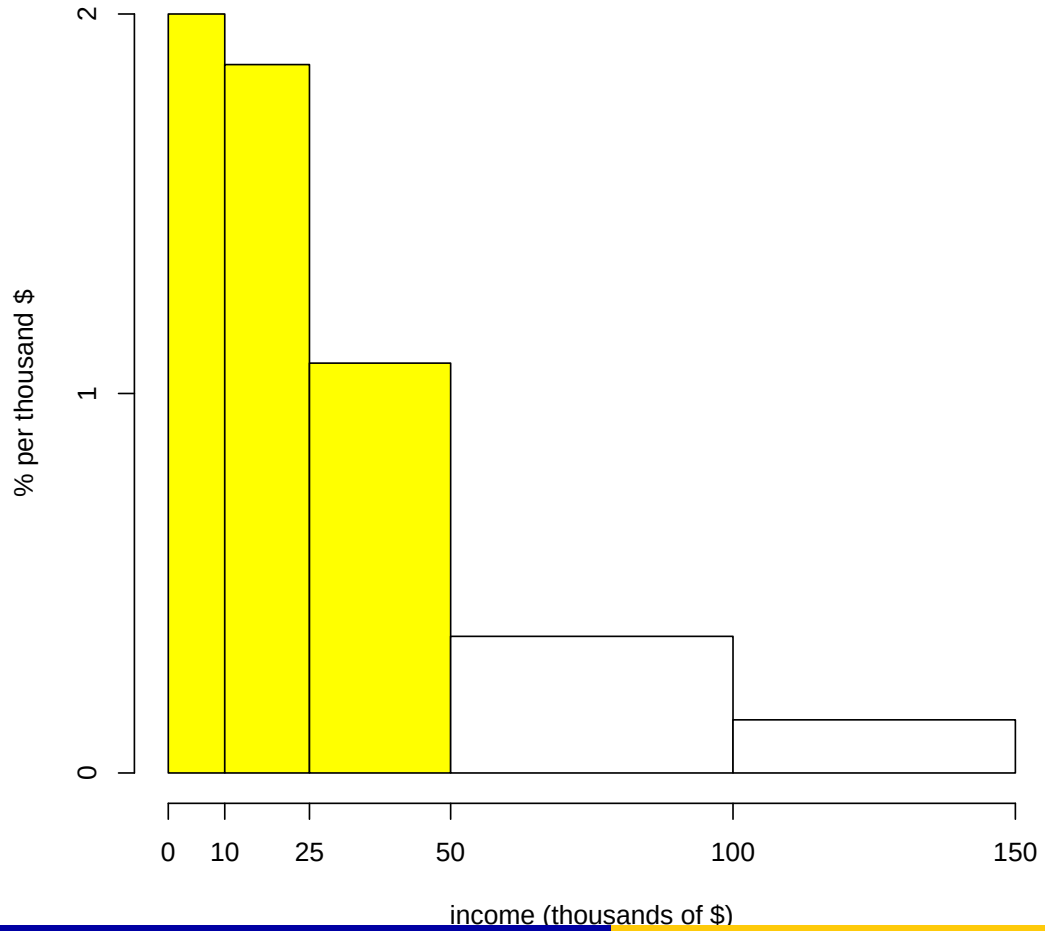
the income distribution, again

income (thousands of dollars)	**percent**	**total percent starting from 0**
$0 - 10$	20	20
$10 - 25$	28	48
$25 - 50$	27	75
$50 - 100$	18	93
$100 - 150$	7	100

Percentile from a histogram

Area to the left of \$50,000 $=$ $20\% + 28\% + 27\%$ $=$ 75%

75th percentile of incomes = \$50,000



Estimating percentiles

How to find percentiles that are not at the edges of the bars?

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Assuming that the incomes are uniformly distributed within each bar, we can estimate any percentile.

Median of income distribution

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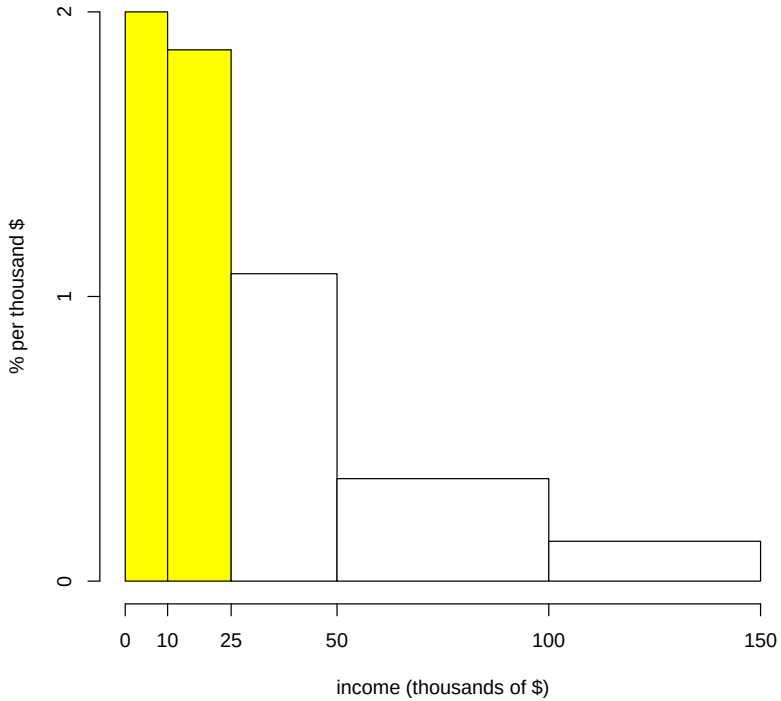

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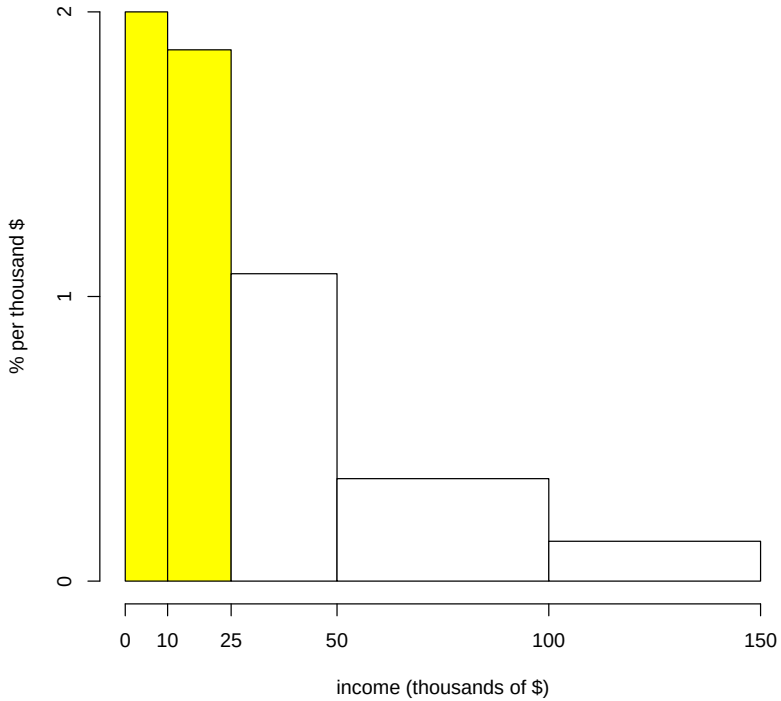

Area between 0 and 25 is 20% + 28% = 48%; need another 2%.

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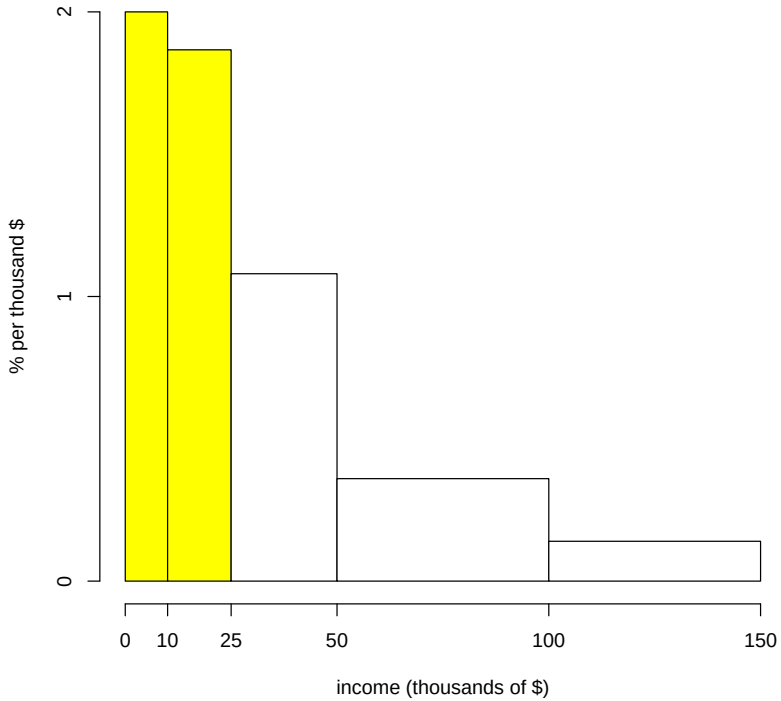

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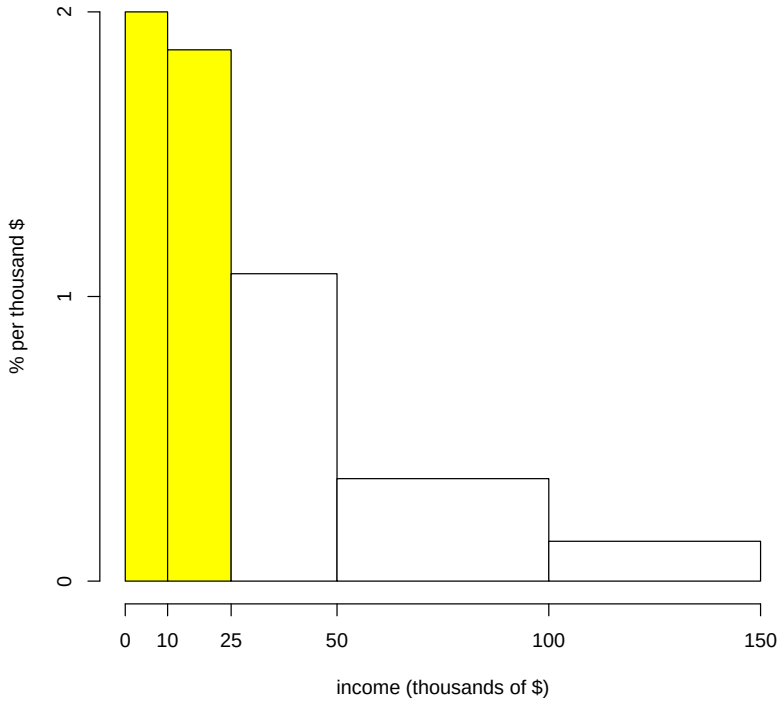

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The area of the 25-50 bar is 27%.

So the **median** income must be somewhere in the 25-50 interval.

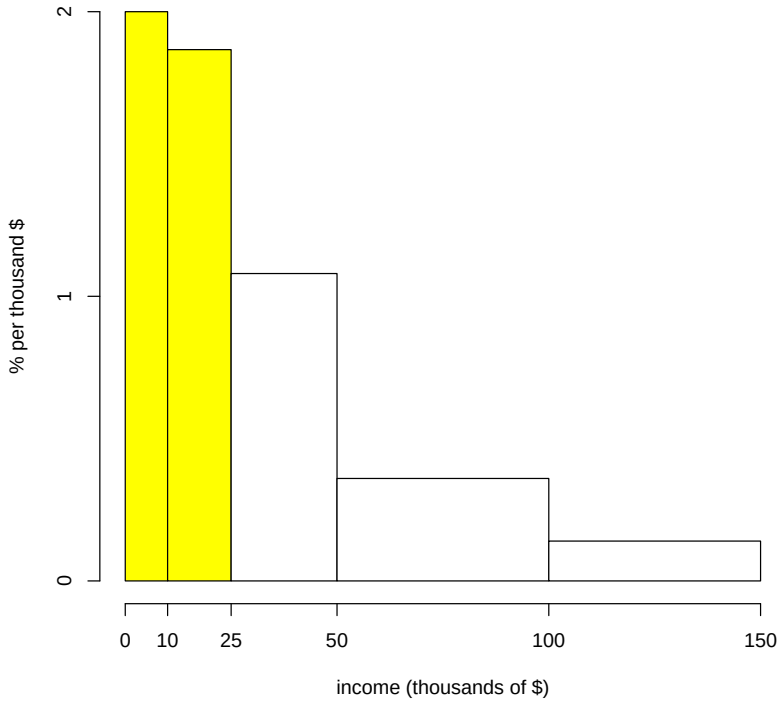
Estimating the median

Yellow bars have a total area of 48%.

Area of 25-50 bar = 27%, and we want 2% of it to get to the median.

estimated median $= 25 + \frac{2}{27} \times (50\text{-}25)$

$=$ 26.85 thousand dollars $=$ \$26,850, roughly



Estimating the 80th percentile

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- The **80th percentile** must be in the 50-100 interval.

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- The **80th percentile** must be in the 50-100 interval.
- The bars from 0 to 50 contain 75% of the area; we need another 5%.

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estimated 80th percentile $= 50 + \frac{5}{18} \times$ (100-50)
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assuming a uniform distribution within bars