Good guesses

Presented by Anastasiya Pantsialei
Task

• There’s a joke that during software development optimists multiply initial time estimation by $e$, pessimists by $\pi$ to obtain real time requirements. Please investigate with which probability these two coefficients cover overall time requirements.
Why important?
Experiment 1
Normal distribution

1. Count max and min

2. Use Sturges rule to count the number of intervals (n)
   \[ n = \lfloor \log_2 N \rfloor + 1 \]
   
   \( N \) – number of people taking part, \([x]\) - integer of \(x\)

3. Count the step (s)
   \[ s = \frac{\text{max} - \text{min}}{n} \]

4. Count the number of guesses in each interval

5. Build the bar chart using Excel
Distribution of Experiment 1
Exponential distribution

\[ y = n \times \left( -\frac{a}{s} \right) - n \times \left( -\frac{b}{s} \right) \]

- \( n \) - number of guesses
- \( a \) - interval beginning
- \( b \) - interval end
- \( s \) - arithmetical mean of all the guesses
Mean for experiment 1

Right answer – 628
Arithmetic mean – 619
Mode – 300, 500, 555
Median – 485
Right interval – 10%
Experiment 2
Distribution of Experiment 2

![Distribution of Experiment 2](chart)
Mean for experiment 2

Right answer – 119
Arithmetic mean – 284
Mode – 200, 250
Median – 250
Right interval – 28%
Experiment 3
Distribution for Experiment 3

0,015-3,37
3,37-6,725
6,725-10,08
10,08-13,435
13,435-16,79
16,79-20,145
Mean for experiment 3

Right answer – 137
Arithmetic mean – 83
Mode – 100, 500
Median – 456
Right interval – 44%
Experiment 4
Distribution for Experiment 4

![Graph showing distribution for Experiment 4 with categories 0.2-0.4, 0.4-0.7, 0.7-0.9, 0.9-1.2, and 1.2-1.4.]
Mean for experiment 4

Right answer – 138
Arithmetic mean – 81
Mode – 160
Median – 70
Right interval – 8%
Time
Planning coefficient

\[ \gamma = \frac{j}{w} \]

- \( j \) – planned time
- \( w \) – actual time
Part 1. Amateur programmer

[Graph showing data distribution over different ranges]
Part 2. Real data
Aims

- We want to check the joke that software development optimists multiply initial time estimation by $e$, pessimists by $\pi$ to obtain real time requirements.
- We are going to investigate with which probability these two coefficients cover overall time requirements.
- We are going to obtain a coefficient on which to multiply our data to ...
Junior programmer
Middle programmer
Senior programmer
Distribution function

\[ y = 1 - e^{-\lambda x} \]

- \( \lambda \) – (in this case) arithmetical mean
- \( e \) – mathematical constant (2.71828182845...)
## Distribution function

<table>
<thead>
<tr>
<th>Level</th>
<th>$\pi$</th>
<th>$e$</th>
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<tbody>
<tr>
<td>Junior</td>
<td>99,5%</td>
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<tr>
<td>Middle</td>
<td>96,8%</td>
<td>95,0%</td>
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<tr>
<td>Senior</td>
<td>98,8%</td>
<td>97,8%</td>
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The perfect coefficient

<table>
<thead>
<tr>
<th>Level</th>
<th>Coefficient</th>
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</thead>
<tbody>
<tr>
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<td>Middle</td>
<td>1,1</td>
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<tr>
<td>Senior</td>
<td>1,4</td>
</tr>
</tbody>
</table>
Results

• The joke is actually true (in > then 95%)
• The perfect coefficient to multiply by are obtained
Thank you for your attention!
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