

# Debugged Python Code

Tarunesh Singh Mehra

March 10, 2025

## Python Code

The following Python script was debugged to ensure correct factor calculation and LaTeX formatting:

```
1 import random
2 import json
3
4 def main():
5     size = random.randint(3, 5)
6
7     factors = []
8     if size == 3:
9         factor1 = random.choice([2, 3, 5, 7, 11, 13])
10        number = factor1 * factor1
11        factors.append(factor1)
12    elif size == 4:
13        factor1 = random.choice([2, 3, 5])
14        factor2 = random.choice([7, 11, 13])
15        number = factor1 * factor2
16        factors.extend([factor1, factor2])
17    elif size == 5:
18        factor1 = random.choice([2, 3, 5])
19        factor2 = random.choice([7, 11, 13])
20        factor3 = random.choice([2, 3, 5])
21        while factor3 == factor1:
22            factor3 = random.choice([2, 3, 5])
23        number = factor1 * factor2 * factor3
24        factors.extend([factor1, factor2, factor3])
25
26    factors.sort()
27    all_factors = [1] + factors + [number]
28    mean_ = sum(all_factors) / len(all_factors)
29
30    # Check if mean is an integer
31    if mean_.is_integer():
32        mean = int(mean_)
33    else:
34        mean = round(mean_, 1)
35
36    # Convert factors to LaTeX-compatible strings
37    factors_latex1 = ", ".join(map(str, factors))
38    factors_latex2 = " + ".join(map(str, all_factors))
```

```

39     # Generate LaTeX question and answer
40     q_tex = rf"""$$\text{{Find the mean of all the factors of }}{{
41         number}}. $$
42
43     \[\text{{Note: Round off the answer to one decimal place.}}\]"""
44
45     a_tex = rf"""$$\text{{We know that factors of }}{{number}}\text{{
46         are }}1, {{factors_latex1}}, \text{{ and }}{{number}}. $$
47
48     $$\text{{Arithmetic mean of all factors of }}{{number}} $$
49     $$ = \frac{{{{factors_latex2}}}}{{{{len(all_factors)}}}} $$
50
51     $$ = \frac{{{{sum(all_factors)}}}}{{{{len(all_factors)}}}} $$
52
53     $$ = {{mean}} $$ """
54
55     # Output result as JSON
56     result = {
57         "q_tex": q_tex,
58         "a_tex": a_tex
59     }
60
61     print(json.dumps(result, indent=4))
62
63 if __name__ == "__main__":
64     main()

```

Listing 1: Debugged Python Script

Find the mean of all the factors of 25.

Note: Round off the answer to one decimal place.

We know that factors of 25 are 1, 5, and 25.

Arithmetic mean of all factors of 25

$$\begin{aligned}
 &= \frac{1 + 5 + 25}{3} \\
 &= \frac{31}{3} \\
 &= 10.3
 \end{aligned}$$