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## Programmer – C++ Evaluation and Problem Question

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### Programmer – C++ Evaluation – Part 1 of 2

**Specification:**

Design and Implement a C++ program that implements the following:

- 2D axis-aligned Rectangle class with floating point coordinates
  - Include methods for constructing an axis-aligned Rectangle with initial size and coordinates
- Algorithm that checks whether or not a Point2D (see below) is contained in an axis-aligned Rectangle
- Algorithm that checks whether or not two axis-aligned Rectangles intersect
- Test code that creates instances of your class and tests your implementation

**Given:**

You can use this struct in your implementation. Feel free to modify this struct as well.

```
struct Point2D
{
    float x;
    float y;
};
```

### Programmer – Problem Question – Part 2 of 2

**Multiples of 2, 3, 5**

Consider a series in ascending order that only consists of numbers that can be factored by any combination of 2, 3 and 5. e.g. 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15....

For example the numbers 7 (prime), 13 (prime) or 14 ( $2 \times 7$ , 7 is not a valid factor), are not in the above series. They are not factorable by 2, 3, 5.

The number 1 is included by definition.

For example, the number in position 18 would be 30:

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|-----|-------------------------------------|
| 1.  | 1                                   |
| 2.  | 2                                   |
| 3.  | 3                                   |
| 4.  | $4 = 2 \times 2$                    |
| 5.  | 5                                   |
| 6.  | $6 = 2 \times 3$                    |
| 7.  | $8 = 2 \times 2 \times 2$           |
| 8.  | $9 = 3 \times 3$                    |
| 9.  | $10 = 2 \times 5$                   |
| 10. | $12 = 2 \times 2 \times 3$          |
| 11. | $15 = 3 \times 5$                   |
| 12. | $16 = 2 \times 2 \times 2 \times 2$ |
| 13. | $18 = 2 \times 3 \times 3$          |
| 14. | $20 = 2 \times 2 \times 5$          |

- 15.  $24=2*2*2*3$
- 16.  $25=5*5$
- 17.  $27=3*3*3$
- 18.  $30=2*3*5$

**Question:**

Design an algorithm to find the number that occupies position 1500 in this series. NOTE: the correct answer is 859963392, use this to verify your algorithm.

Please be prepared to discuss your solution/solutions to this problem, as well as the steps you used to arrive at the solution.