CS50P *FINAL* PROJECT

CS50P
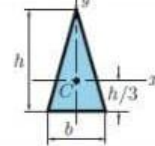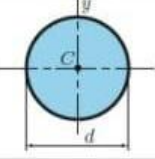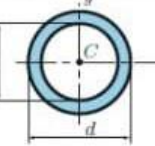
AREA MOMENT OF INERTIA CALCULATOR

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8/2/2024

Agenda

What is Area Moment of Inertia?

Why is it important?
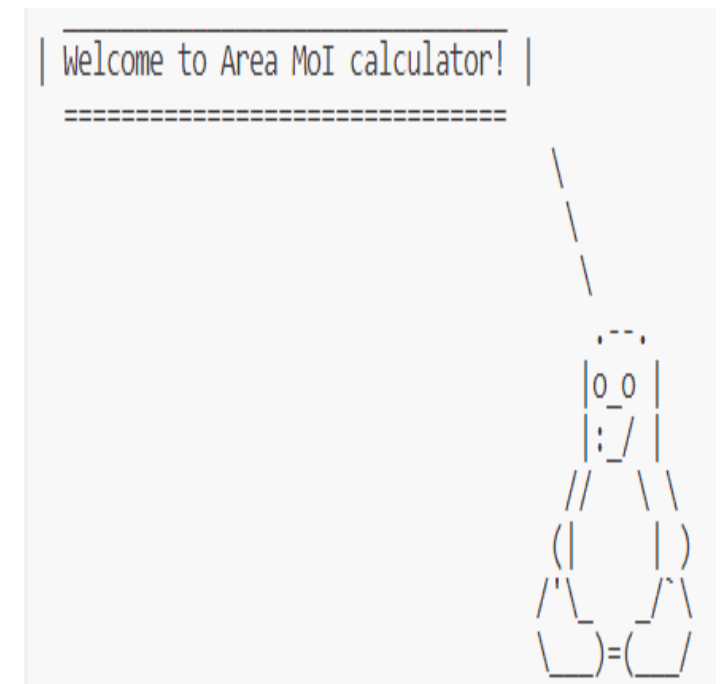
How does the program work?

What is Area Moment of Inertia?

Measures how much resistance a shape has to bending force due to its geometry.

Unit: Length^4

Source: Understanding the Area Moment of Inertia | The Efficient Engineer

Why?

a higher Area Moment of Inertia, indicates that the object is more resistant to bending or deformation when subjected to external forces.
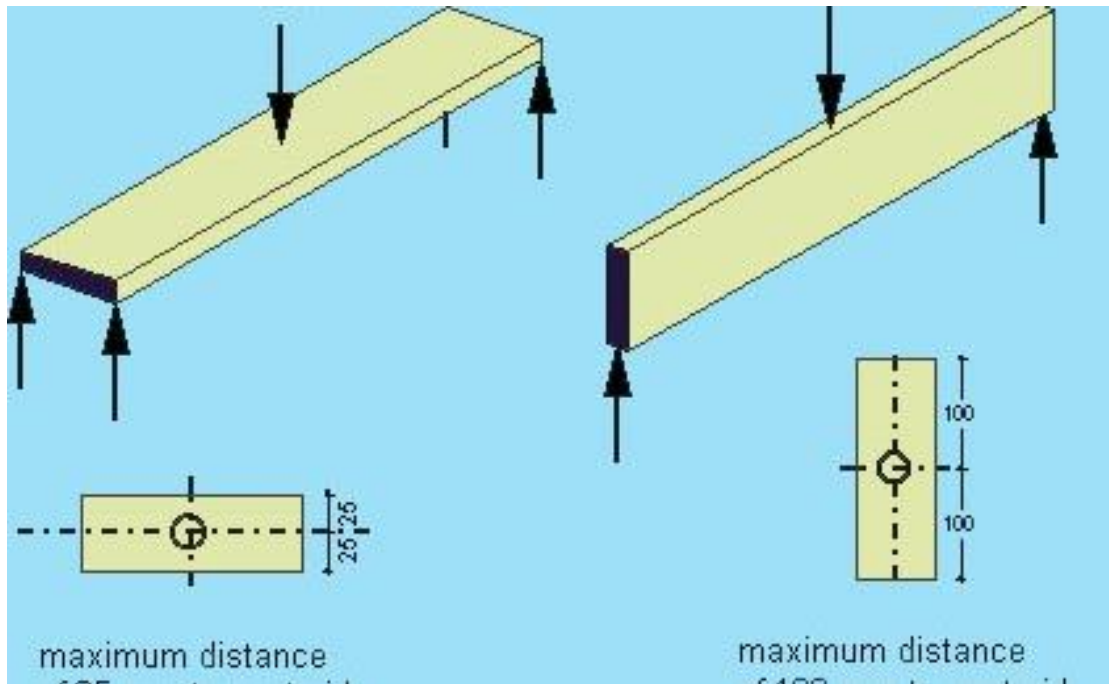
Effect of Area Moment of Inertia on bending forces and deflection

Source: Section Properties (boeingconsult.com)
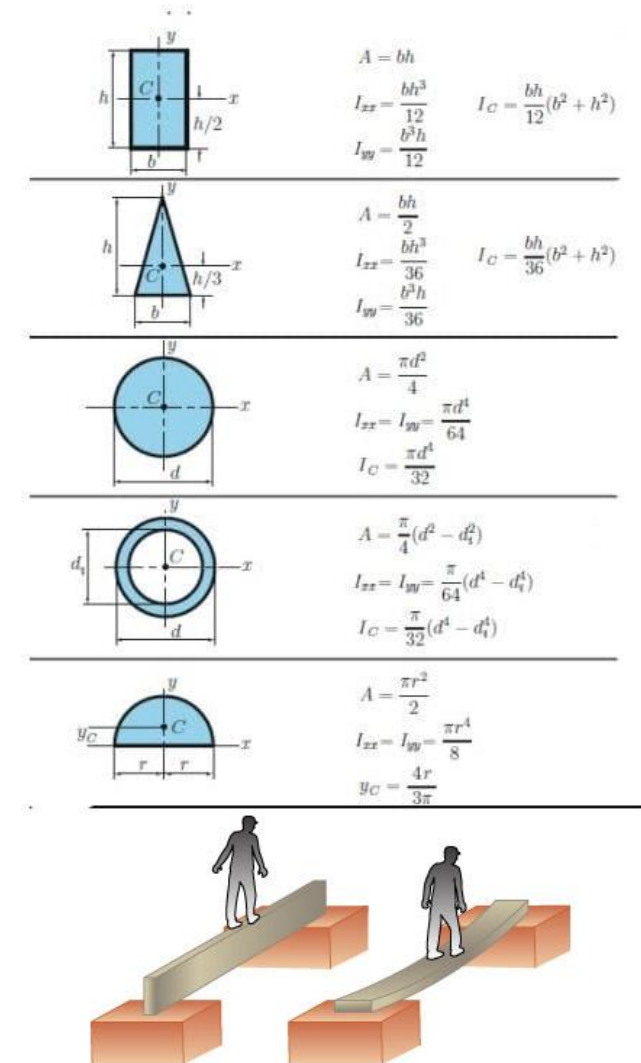
Effect of Area Moment of Inertia on bending forces and deflection

Source: Section Properties (boeingconsult.com)

```
| Welcome to Area MoI calculator! |
  ================================
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                                   \___)=(___/
+------+----------------------------------+
| Key: | Calculate Area Moment of Inertia for: |
+------+----------------------------------+
|  1   |              Rectangle           |
|  2   |              Triangle            |
|  3   |              Trapezoid           |
|  4   |               Circle             |
|  5   |               Ellipse            |
+------+----------------------------------+
Selection No. : 1

Please enter breadth (b) Rectangle : 5
Please enter height (h) Rectangle : 6
+-----------+---------------+---------------+-----------+
|   Shape   |      Ix       |      Iy       |    Area   |
+-----------+---------------+---------------+-----------+
| Rectangle |               |               |           |
|           | 90.0 (Unit ⁴) | 62.5 (Unit ⁴) |           |
|           |               |               | 30 (Unit²)|
+-----------+---------------+---------------+-----------+

Continue? (y/n): █
```

Usage

1. Select the desired shape for calculating its Area Moment of Inertia.

2. Input the dimensions of the chosen shape.

3. Press 'y' or 'Y' to proceed, else press 'n' or 'N' to exit.

LIVE
RUN

```python
import math
from PIL import Image
import cowsay
from tabulate import tabulate
import sys
```

Libraries

- math
- PIL
- cowsay
- tabulate
- sys
- pytest

Concepts

- OOP
- try & except
- test
- Raise
- match-case
- while

CS50 Shirtificate

Zahy Elgendy took CS50P

Thank you Prof. David Malan!

THANK *YOU*