

Loading of a Beam

Loading of a Beam Programme allows user to manually input in data or read off a file in a certain format. It will further prompt the user to select the needed beam type and different inputs will be needed for each type (such as length, magnitude of load, etc) Program allows for any number of loads acting on the beam and will calculate the reactions forces at the support (R_a and R_b). In addition, it will calculate the bending moments for the loads and supports. Lastly, using turtle to demonstrate and draw the necessary beam type, shear force diagram and bending moment diagram.

How to run the Program:

1. Run the main program from loadingbeam.py.
2. Program will prompt user to whether to input data manually or read off a file. (FileType : File)
3. If users pick to input data manually, follow the instructions the program prompts out.
4. If users pick to read off a file. Enter the correct text file name.
5. After the following prompts, it will then proceed with the calculations and graph visualization.

Program Key Strengths:

- Beam and Shear Force Diagram Visualization with Turtle.
 - Simply Supported
 - Overhanging
 - Cantilever

All types of beams are accurately represented and displayed with turtle graphics.

- File reading and manual input options.
- Quality user interface and comprehensive visual graphics
- Shear Force Diagram normalization

Shear Force Diagram will move its origin (0,0) accordingly to the highest point and lowest point of the graph. For example, if the diagram has a higher negative shear force, it will push the origin upwards to allow for more space to show the graph more prominently.

Picture example

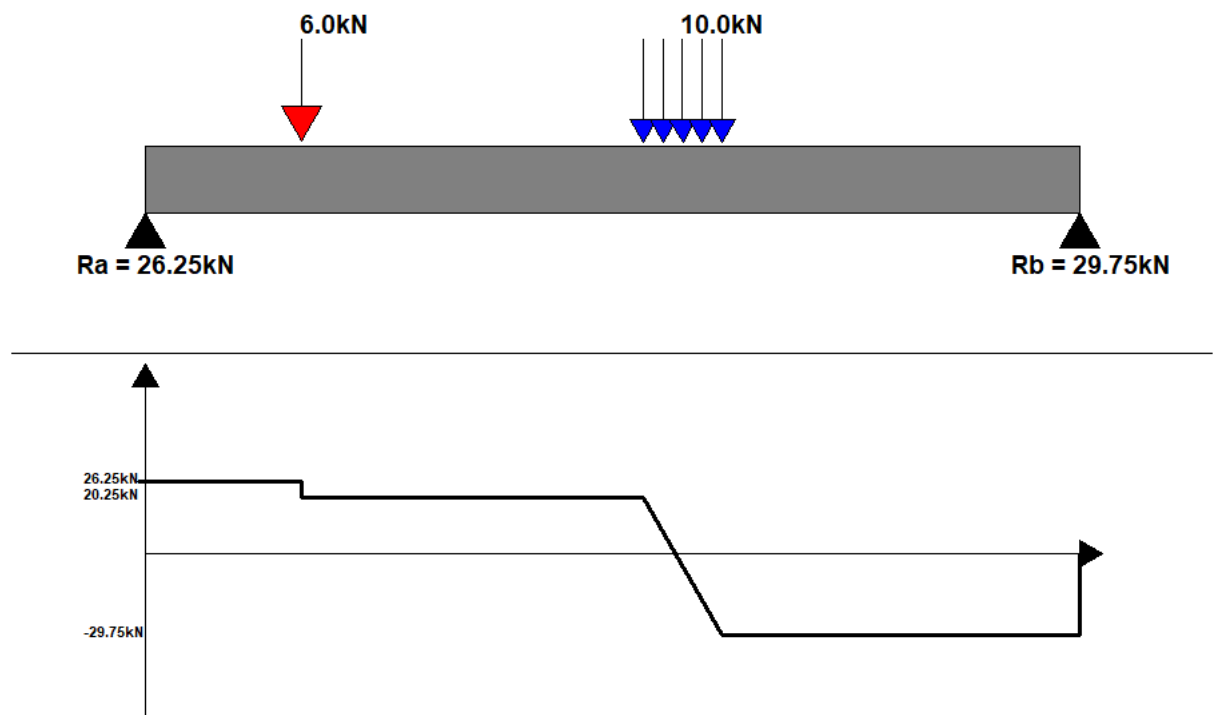
- Overhanging Beam Calculations

Additional Feature: Allows calculations for any support at any given point. It is demonstrated as such:



Program will prompt user to provide distance from the left of the beam for both supports and the necessary calculations will be done.

- Beam and Shear Force Diagram equivalent scaling



Beam and shear force diagram are made to be equal in scale to allow for easy visualisation.

Assumptions:

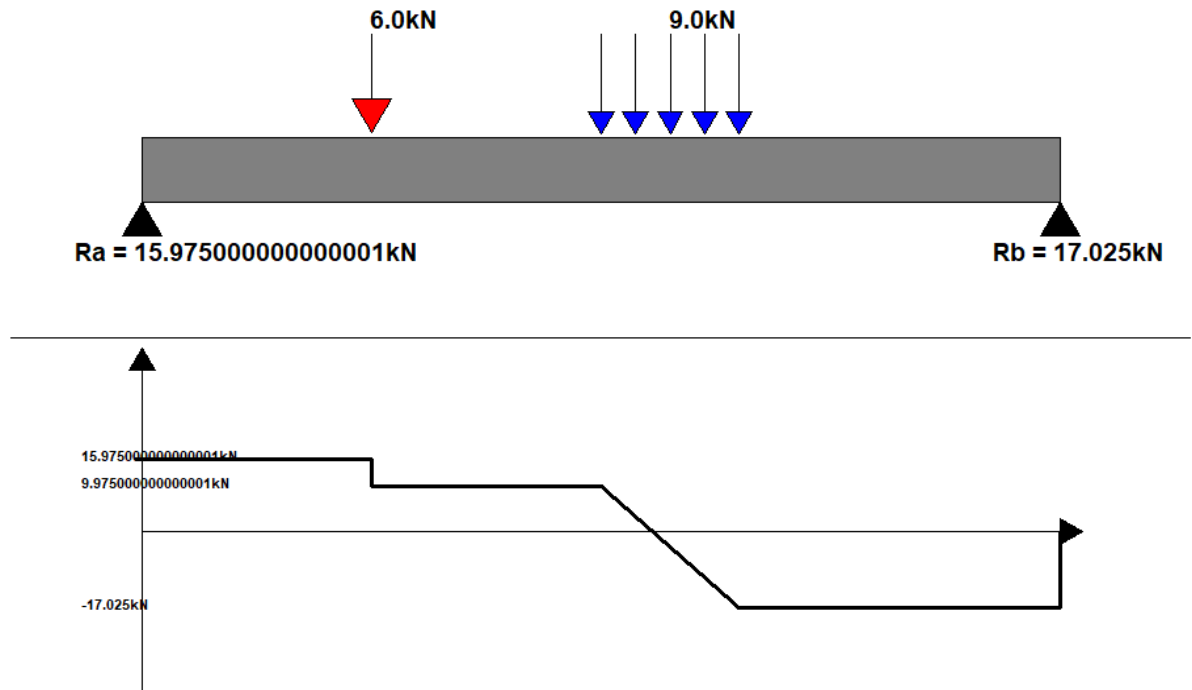
1. Overhanging beam calculations are assumed to have only 2 supports.
2. For overhanging beam, distributed and point loads are assumed to not coincide with or at the same point of the supports.
3. Screen size of at least 700 x 700 to prevent clipping and to see the full graphics visualization.

Limitations:

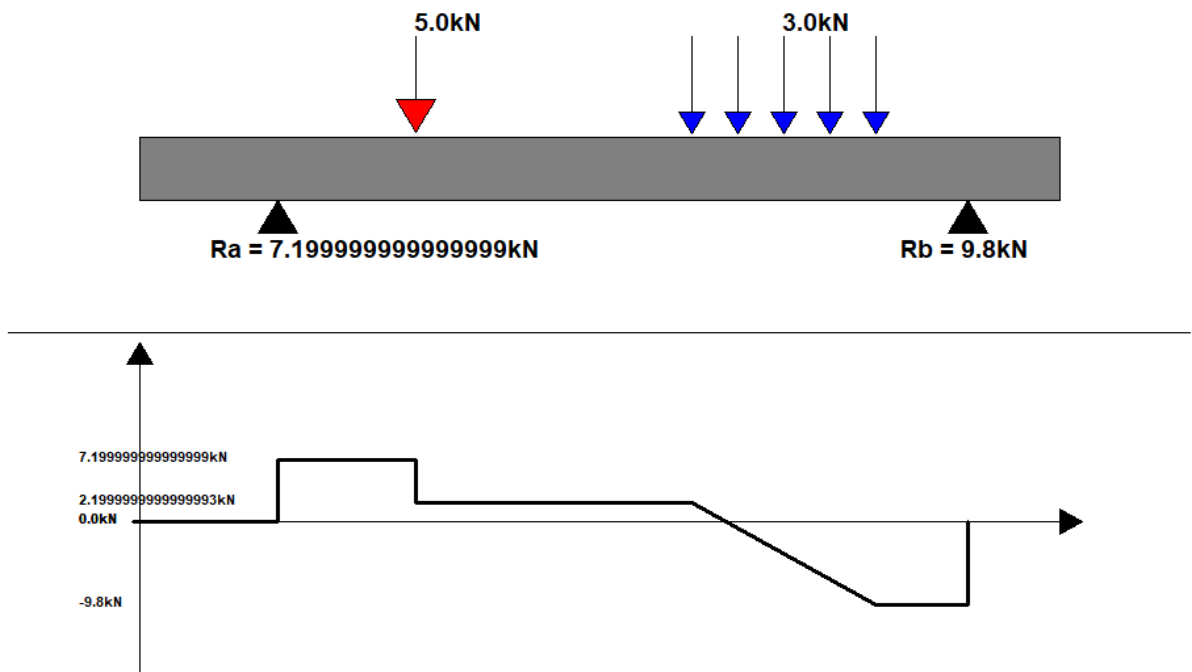
1. Unable to complete the graphs for bending moment.

Program screenshots:

Simply-supported Example:



Overhanging Example:



Cantilever Example:

