Python Programming @ The department of Computer Science

UNIVERSITY OF LIVERPOOL

Floating Barge

Requirements

The Figure shows an open topped iron barge of length `L`, Breadth `B` and Height `H`. We can calculate the draft `d` of the barge (the proportion of `H` which is submerged) using Archimedes' Principle:

When a body is immersed in a liquid it displaces a volume of liquid equivalent to the mass of the body.

Assuming that the iron from which the barge is built weighs about `7.87` tonnes per m^3, water weighs `1.00` tonnes per m^3 and that the iron is `0.01`m thick, the calculation comprises three steps:

1. Calculate the volume of iron used in the construction of the barge using:

```
Vol. (m³) = (L×B×H) -
     ((L-0.02)×(B-0.02)×(H-0.02))
```

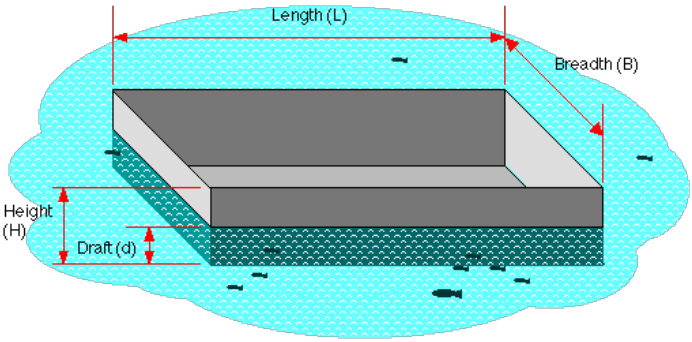
2. Calculate the mass (weight) of the barge (the iron used to construct it) using:

```
mass (tonnes) = vol. × dens. iron
```

3. Calculate the draft using:

$$\text{draft (m)} = \frac{\text{mass}}{L \times B \times \text{dens. water}}$$

Create a Python programme that calculates the draft `d` of a barge given its length `L`, Breadth `B` and Height `H`.



Floating barge

Example

`L=12.000`m, `B=6.000`m, `H=3.000`m

```
vol = (12.000×6.000×3.000) -
                  (11.080×5.080×2.090)
    = 216.000-214.205=1.795m³

mass = 1.795*7.780 = 13.967tonnes

draft = 13.967/(16*6*1.000) = 0.194m
```

Note

By convention names used for constants (such as the weight of iron or water as featured in this exercise) are written in upper case.

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