Assessment: Assignment

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Lab Section Number: 342

Due Date: 6th October,2024

Understand the problem

* The volume of the cylinder is V = πr2h (r = radius of circle and h = height of the cylinder) [1]
* A formula that will perform the cylinder pyramid volume calculation given the problem's requirements.

Volume1 = πr2h (r = radius of bottom cylinder and h = height of the bottom cylinder)

Volume2 = π(0.8r)2h (r= radius of middle cylinder and h = height of the middle cylinder)

Volume3 = π(0.64r)2 (r= radius of upper cylinder and h = height of the upper cylinder)

Total Volume of cylinder = Volume1 + Volume2 + Volume3

* 1st Calculation :

r = 0.5 cm, h = 2 cm

Volume1 = πr2h

= 3.14 \* 0.5 \* 0.5 \* 2

= 1.57 cm3

Volume2 = π(0.8r)2h

= 3.14 \* 0.8 \* 0.8 \* 0.5 \* 0.5 \* 2

= 1.0048 cm3

Volume3 = π(0.64r)2h

= 3.14 \* 0.64 \* 0.5 \* 0.5 \* 2

= 0.643072 cm3

Total Volume of cylinder = Volume1 + Volume2 + Volume3

= 1.57 + 1.0048 + 0.643072

= 3.217872 cm3

* 2nd Calculation :

r = 1 m, h = 5 m

Volume1 = πr2h

= 3.14 \* 1 \* 1 \* 5

= 15.7 m3

Volume2 = π(0.8r)2h

= 3.14 \* 0.8 \* 0.8 \* 1 \* 1 \* 5

= 10.048 m3

Volume3 = π(0.64r)2h

= 3.14 \* 0.64 \* 0.64 \* 1 \* 1 \* 5

= 6.43072 m3

Total Volume of cylinder = Volume1 + Volume2 + Volume3

= 15.7 + 10.048 + 6.43072

= 32.17872 m3

* 3rd Calculation :

r = 17 m, h = 7 m

Volume1 = πr2h

= 3.14 \* 17 \* 17 \* 7

= 6352.22 m3

Volume2 = π(0.8r)2h

= 3.14 \* 0.8 \* 0.8 \* 17 \* 17 \* 7

= 4065.4208 m3

Volume3 = π(0.64r)2h

= 3.14 \* 0.64 \* 0.64 \* 17 \* 17 \* 7

= 2601.86931 m3

Total Volume of cylinder = Volume1 + Volume2 + Volume3

= 6352.22 + 4065.4208 + 2601.86931

= 13019.5101 m3

**(Note: I use ‘+=’ Arithmetic operator method in Eclipse IDE)**

UML Class Diagram(s)

A screenshot of a computer program

Description automatically generated

Pseudocode

Start

double volumePyramid (double radius, double height)

Declarations

double volume

volume = PI\*(radius^2)\*height

volume += PI\*((radius\*0.8)^2)\*height

volume += PI\*((radius\*0.64)^2)\*height //volume += PI\*((radius\*(0.8^2))^2)\*height

output volume

Stop

Start

Declarations

double radius

double height

double volume

output "Enter radius: "

input radius

output "Enter height: "

input height

output "The volume of pyramid is: "

volume = calculate total Volume (radius, height)

output "This code was written by Kavya Vasani"

output "Student Number = 041163941”

Stop

Algorithm Test Table

|  |  |  |  |
| --- | --- | --- | --- |
| Input | Expected Output | Actual Output | Description |
| Radius – 0.5  Height – 2 | Enter Radius:0.5  Enter Height:2  The Volume of Pyramid is: 3.217872 | Enter Radius:0.5  Enter Height:2  The Volume of Pyramid is: 3.220 | Testing the method's main logic, it should ask for two input values, and then output the volume. |
| Radius – 1  Height – 5 | Enter Radius:1  Enter Height:5  The Volume of Pyramid is: 32.17872 | Enter Radius:1  Enter Height:5  The Volume of Pyramid is: 32.19 | Testing the method's main logic, it should ask for two input values, and then output the volume. |
| Radius – 17  Height – 7 | Enter Radius:17  Enter Height:7  The Volume of Pyramid is: 13019.5101 | Enter Radius:17  Enter Height:7  The Volume of Pyramid is: 13026.114 | Testing the method's main logic, it should ask for two input values, and then output the volume. |

Program Test Table

|  |  |  |  |
| --- | --- | --- | --- |
| Input | Expected Output | Actual Output | Description |
| Radius: 0.5  Height: 2 | Enter Radius of Pyramid:0.5  Enter Height of Pyramid:2  The Volume of Pyramid is: 3.217872 | Enter Radius of Pyramid:0.5  Enter Height of Pyramid:2  The Volume of Pyramid is: 3.220 | Testing the method's main logic problem, it should ask for two input values, and then output the total volume. |
| Radius: 1  Height: 5 | Enter Radius of Pyramid:1  Enter Height of Pyramid:5  The Volume of Pyramid is: 32.17872 | Enter Radius of Pyramid:1  Enter Height of Pyramid:5  The Volume of Pyramid is: 32.19 | Testing the method's main logic problem, it should ask for two input values, and then output the total volume. |
| Radius: 17  Height: 7 | Enter Radius of Pyramid:17  Enter Height of Pyramid:7  The Volume of Pyramid is: 13019.5101 | Enter Radius of Pyramid:17  Enter Height of Pyramid:7  The Volume of Pyramid is: 13026.114 | Testing the method's main logic problem, it should ask for two input values, and then output the total volume. |
| Radius: radius  Height: height | Enter Radius of Pyramid: radius  Enter Height of Pyramid: height  The Volume of Pyramid is: | Enter Radius of Pyramid: radius  Enter Height of Pyramid: height  The Volume of Pyramid is: | Exception in thread "main" java.util.InputMismatchException  Invalid input |
| Radius: -5  Height: -6 | Enter Radius of Pyramid: -5  Enter Height of Pyramid: -6  The Volume of Pyramid is: -965.3616 | Enter Radius of Pyramid: -5  Enter Height of Pyramid: -6  The Volume of Pyramid is: -965.851 | Testing the method's main logic problem, it should ask for two input values, and then output the total volume. |
| Radius: 0  Height: 6 | Enter Radius of Pyramid: 0  Enter Height of Pyramid: 6  The Volume of Pyramid is: 0 | Enter Radius of Pyramid: 0  Enter Height of Pyramid: 6  The Volume of Pyramid is: 0 | Testing the method's main logic problem, it should ask for two input values, and then output the total volume. |

References / Sources Cited

# References

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| [1] | "Varsity Tutors," [Online]. Available: https://www.varsitytutors.com/hotmath/hotmath\_help/topics/volume-of-a-cylinder. [Accessed 1 September 2024]. |