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**// Filename: Lab1A\_WillFichter.doc**

**// Date: August 15, 2019**

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**// Description: IPO chart that is being used to describe the algorithm of various problems**

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1. Mary is a big fan of tropical fish. She has a few tanks of fish at home. To maintain a healthy environment for the fish, she needs to add conditioner to the water once a week. The amount of conditioner added is determined by the volume of the tank. According to the direction on the bottle, she has to add 1 ml of conditioner per 100 cubic inches of water. She wants a program to calculate exactly how much conditioner to add to a tank of water. All tanks are in rectangular shape. The program will ask for the length, the width and the height of the tank. It will calculate and display the amount of conditioner to be added.

|  |  |  |
| --- | --- | --- |
| Input | Processing (Algorithm) | Output |
| Length  Width  Height | Input the length, width, and height  Multiply Length, Width, and Height to get the volume  Conditioner = Volume (in inches) / 100 inches  Display the amount of conditioner | amount of conditioner that has to be added |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| length | width | height | Volume | Conditioner |
| 20  22.5 | 10  16 | 10  15 | 2,000  5,400 | 20  54 |

20\*10\*10 == 2,000 inches

2,000 / 100 == 20 ml of conditioner

22.5\*16\*15 == 5,400 inches

5,400 / 100 == 54 ml of conditioner

1. Recently Mary has bought a few more tanks of fish. Since the new tanks she bought this time are all in cylindrical shape, the program developed in Question 1 is inapplicable. She needs a new program that will ask for the radius and the height of the tank. It will calculate and display the amount of conditioner to be added.

|  |  |  |
| --- | --- | --- |
| Input | Processing (Algorithm) | Output |
| Radius  Height | Input the radius and height  Find the volume using: Radius \* Radius \* 3.1416 \* height  Conditioner = Volume (in inches) / 100 inches  Display the amount of conditioner | Amount of conditioner needed |

|  |  |  |  |
| --- | --- | --- | --- |
| radius | height | Volume | Conditioner |
| 10  14.5 | 10  18 | 3,141.6  11,889.3852 | 31.416  118.893852 |

10\*10\*3.1416\*10 == 3,141.6 inches

3,141.6 / 100 == 31.416 ml of conditioner

14.5\*14.5\*3.1416\*18 == 11,889.3852

11,889.3852 / 100 == 118.893852 ml of conditioner

1. Jackets Unlimited is having a sale on its merchandise. The manager wants a program that requires the clerk to enter the original price of a jacket and the discount rate. The program should then display the new sales price

|  |  |  |
| --- | --- | --- |
| Input | Processing (Algorithm) | Output |
| Original jacket price  Discount rate | Input the original price and the discount rate  What to subtract = original sales price \* discount rate  New sales price = original price - what to subtract  Display new sales price | New sales price |

|  |  |  |  |
| --- | --- | --- | --- |
| original price | discount rate | What to subtract | New sales price |
| 100  50 | 0.25 (i.e. 25%)  0.10 (i.e. 10%) | 25  5 | 75  45 |

100\*0.25 == 25

100 – 25 == 75

50 \*0.10 == 5

50 – 5 == 45