

# ITEC 120: Principles of Computer Science I

## Homework 3 – Value added tax

>>>>>> **Due Date: Friday, February 7th 10:00PM via Blackboard** <<<<<<<

In doing this homework, remember to abide by the RU Honor Code.

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### Problem 1

5 points

You are a new employee at the IRS and have been tasked with creating simulations that show the impact of new tax ideas. Given the recent political climate with the tea party, your boss is eager to provide a new system of taxation that will make people happier. To illustrate how the taxation works from the ground up, your simulation will calculate the Value Added Tax (VAT) from the lumberjack, to the sawmill, to the carpenter, to the real estate agent. The goal for the simulation is to show the tax for each stage of an item's creation.

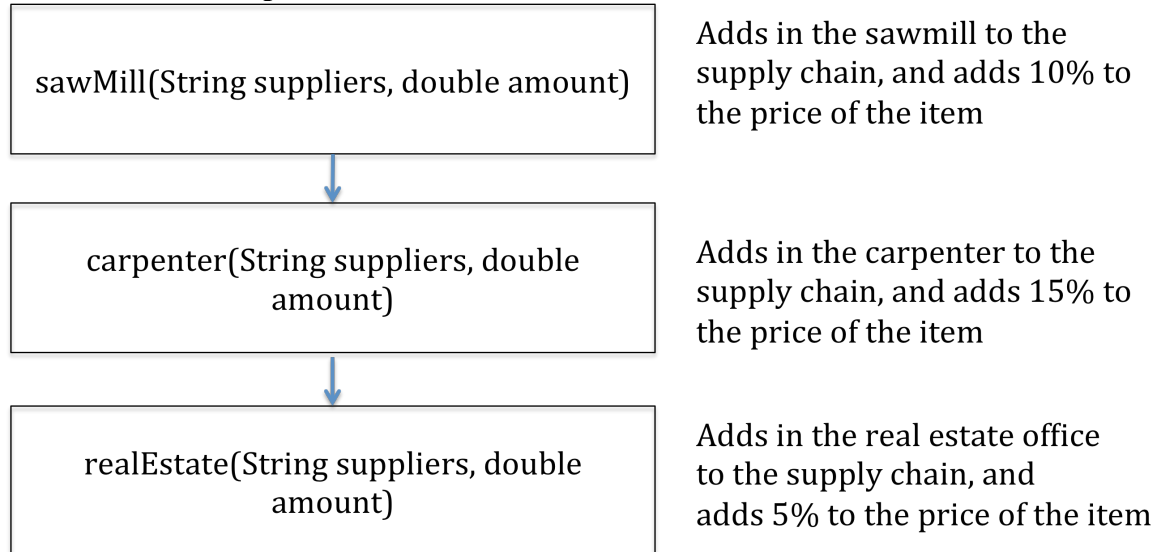
Because you are new, a senior developer has provided a driver program and an architecture diagram to help you implement your project. The driver program prints out a header to indicate the program is starting, starts the processing for the tax calculation, and then prints out a footer indicating that the simulation is over. You must use the FunctionContainer file to implement the functions used in the driver class.

The architecture description lists the different functions used in the program, their parameters, and the flow of execution.

### Driver program:

```
public class Driver4VAT
{
    public static void main(String[] args)
    {
        FunctionContainer program =
            new FunctionContainer();
        program.header();
        program.sawmill("Lumberjack", 200);
        program.footer();
    }
}
```

### Architecture description:



### Reiteration of steps required in the architecture:

You will need to write five functions: header, footer, sawMill, carpenter, and realEstate. The Driver4 program will call the header function, then the sawMill function. The sawMill function will call the carpenter function, which will call the realEstate function. Lastly, when Driver4 resumes executing code, it calls the footer method, then exits.

### Responsibility of each function:

Your program will start off with the Forester bringing in \$200 worth of lumber. This information will be passed to the sawMill function which will add itself to the supply chain (String concatenation, i.e. from Lumberjack to Lumberjack-Sawmill), print out how much VAT is added by the particular job, and send the new cost and supply chain to the next function (carpenter). The carpenter function will repeat the same steps and will then send its updated price to the realEstate function which will repeat the same steps and will then exit.

### Output Format:

Your program must match the following format exactly.

```
Begin VAT calculation program
Supply chain = Lumberjack-Sawmill
Value added tax = 20.0
Supply chain = Lumberjack-Sawmill-Carpenter
Value added tax = 33.0
Supply chain = Lumberjack-Sawmill-Carpenter-RealEstate
Value added tax = 12.65
Total cost = 265.65
End VAT calculation program
```

*Hints:*

Write all of the functions with blank bodies (this will allow your program to run).

Write the header and footer functions first.

See me or a tutor if you need help.

After you are finished writing and testing your program, log into Desire 2 Learn and submit the java file under the homework 3 assignment. You can demo the homework the next school day after it is due, or it will be graded automatically. If you choose not to demo your homework you cannot contest the grade you receive.

**Grading rubric**

1 point – Compiles

1 point – Prints out header and footer properly

2 points – Produces correct output that conforms to the format described above.

1 point – Follows the design listed in the architecture description