Algorithms

Software Development Method

1. Specify the problem requirements
2. Analyze the problem
3. Design the *algorithm* to solve the problem
4. Implement the algorithm
5. Test and verify the completed program
6. Maintain and update the program

Software Development Method

1. Specify the problem requirements
   - In this class, often done for you
2. Analyze the problem
   - Your job – what are the inputs and outputs
3. Design the *algorithm* to solve the problem
   - Your job – write it down and turn it in!
4. Implement the algorithm
   - Your job
5. Test and verify the completed program
   - Your job – this is the most time consuming part
   - Go back to step 4 if your program fails the tests
6. Maintain and update the program
   - Always assume you will reuse your code at some point

Algorithms

- Step-by-step procedure for solving a problem
- Be as specific as possible – include all steps

- Example – doing your laundry

Calculate Tax on an Item

- Problem
- Analysis
- Algorithm design
- Implementation
- Testing
- Maintenance

```
#A program to calculate tax and total cost for an item.

#determine rate of taxation

#ask user for the cost of the item

#calculate the tax

#calculate total cost

#display the results
```

```
#Name: Sami Rollins
#A program to calculate tax and total cost for an item.

#determine rate of taxation
TAX_RATE = .0825

#ask user for the cost of the item
cost = input("Enter item cost: ")

#calculate the tax
tax = cost*TAX_RATE

#calculate total cost
total = cost+tax

#display the results
print "Cost: ", cost
print "Tax : ", tax
print "Total: ", total
```

Heading

```
#Name: Sami Rollins
#A program to calculate tax and total cost for an item.
```

- Indicates what the program does
- Comments
  - # to the end of the line

Variables

```
#determine rate of taxation
TAX_RATE = .0825
```

- Sets the value of the variable TAX_RATE to be .0825

Input

```
#ask user for the cost of the item
cost = input("Enter item cost: ")
```

- Prompt the user for the cost of the item and store the response in the variable cost

Calculation

```
#calculate the tax
tax = cost*TAX_RATE
```

- Multiply the cost times the tax rate and store the result in the variable tax

Calculation

```
#calculate total cost
total = cost+tax
```

- Add the cost and the tax and store the result in the variable total

Output

```
#display the results
print "Cost: ", cost
print "Tax : ", tax
print "Total: ", total
```

- Display the results for the user