Unit 1 Problems   A *possible* set of solutions

1. **My roommate has announced that we are going to run a 5k race together in October. How far is that?**

   This problem is asking me to convert a distance in kilometers to a distance in miles.

   We are provided with a distance in kilometers --- in this case 5k.
   The output should be the corresponding distance in miles.

   There is an arithmetic formula to express this relationship. To convert km to miles, take the number of km and **multiply** by .621.

Steps	Computing Aspect
Get distance in km	Input
Multiply km * .621	Arithmetic
Display	Output

2. **The envelope was labeled to "Johnson, Keith". What is the first name of the recipient?**

   This problem is asking me find the first name from a whole name.

   We are provided with the whole name - From the example, it appears that the name is in the format "Lastname, Firstname"
   The output should be only the Firstname.

   My solution depends on the assumption that the full name is provided in the format "Lastname, Firstname". The comma acts as a separator between the last and first name.

Steps	Computing Aspect
Collect Name	Storage
Find the comma	Text Operation
Everything after the comma is the first name	Text Operations
Display	Output

3. **My 5-year-old son wants to go on the water slide at the Falls aquatic center (by himself). Will the lifeguard object?**

There might be rules that determine if someone is allowed to use the slide. This problem is asking to see if your son meets these rules.

Before I can figure out what input needs is relevant, I need to understand what the rules are – which are not stated in the problem. Let's assume there are height, age and weight requirements. I would need to collect this information. We know that your son is 5 years old, but we still need to find out additional data about his height and weight.

The output should be a message indicating whether or not he is allowed to ride the slide.

Steps	Computing Aspect
Get Input – Height, Age, Weight	Input
Compare Height to required Height	Relational Operation, Decision
Compare Weight to required Weight	Relational Operation, Decision
Compare Age to required Age	Relational Operation, Decision
Are all the requirements met?	Logical Operation
Display results	Output

4. **The Thing-a-ma-bob shop offers volume discounts. Thing-a-ma-bobs are $6.99 each, but on orders of 10 or more, you can get them for $5.49 each. How much does my order cost?**

Based on a number of Thing-a-ma-bobs, I need to compute a total bill.

Input: How many Thing-a-ma-bobs were ordered?

Output: Total Price.

Steps	Computing Aspect
Get Input – Number of Thing-a-ma-bobs	Input
Compare Number ordered to 10 to determine the price per item.	Relational Operation, Decision, Storage
Multiply number of items * price per item	Arithmetic Operation
Display output	Output

5. **We need a table that shows the relationship between Celsius and Fahrenheit temperature scales. It should start with freezing in Celsius and work your way up to boiling in 5 degree increments.**

We need to repeatedly convert Celcius to Farenheit –and keep track of the outcomes in a table format.

Input – None really? We could generalize the problem to allow start, stop or increment values.

Output – a conversion table.

Steps	Computing Aspect
Initialize Celsius temperature to 0	Storage
Repeat the following steps until the Celsius temperature reaches 100	Comparison (am I done yet), Repetition
Fahrenheit temperature is Temperature in Celsius multiplied by 9, divided by 5. Then add 32 .	Arithmetic
Increase Celsius temperature by 5	Arithmetic
Add these values to the table	Text Operations
Display output	Output