Step 1

Convert from miles to kilometers.

Conversion generally is ((X + k1) * C) + k2

In our case k1 and k2 are 0. So we just get X * C

Demo - lookup conversion from miles to kilometers

```

# Step 1 - constants

miles = 3
conv = 1.60934
km = miles * conv

```

Demo - of this as a visualization

Step 2 - Input with error

```

# Step 2 - will error with type error

print ( "Enter Miles" )

miles = input()

conv = 1.60934
km = miles * conv

print ( "km = {}".format(km) )

```

Step 3 - Fixed error / Types

```

# Step 3 - inline after fixing type

```

```
print ( "Enter Miles" )

miles_str = input()
miles = int(miles_str)
conv = 1.60934
km = miles * conv

print ( "km = {}".format(km) )
```

Step 4 - Make a function

```

# Step 4 - After making a function

def mi_to_km ( mi ):
    conv = 1.60934
    km = mi * conv
    return (km)

print ( "Enter Miles" )

miles_str = input()
miles = int(miles_str)

km = mi_to_km(miles)

print ( "km = {}".format(km) )
```

Step 5 - Make Reusable Code

step-5.py:

```

# Step 5 - with function and a test.

import mi_to_km

print ( "Enter Miles" )

miles_str = input()
miles = int(miles_str)

km = mi_to_km.mi_to_km(miles)
```

```

print ( "km = {}".format(km) )
```

conv/mi_to_km.py:

```

# mi_to_km converts from miles as an integer or float to kilometers.
def mi_to_km ( mi ):
    conv = 1.60934
    km = mi * conv
    return (km)

# Automated Test
if __name__ == "__main__":
    n_err = 0
    x = mi_to_km ( 3 )
    if x !=  4.82802:
        n_err = n_err + 1
        print ( "Error: Test 1: conversion not working, expected {} got {}".f
    x = mi_to_km ( 0 )
    if x != 0:
        n_err = n_err + 1
        print ( "Error: Test 2: conversion not working, expected {} got {}".f

    if n_err == 0 :
        print ( "PASS" )
    else:
        print ( "FAILED" )

```

Step 6 - Add documentation

This is really a little step in this program - but a really important one for this class..

```

# Author: Philip Schlump
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# Main program to read in values and convert from miles (mi) to kilometers (k

# Step 5 - with function and a test.

import mi_to_km

print ( "Enter Miles" )
print ( "Enter Miles" )

miles_str = input()
miles = int(miles_str)

km = mi_to_km.mi_to_km(miles)

print ( "km = {}".format(km) )

```