Metropolitan State University

ICS 140 Computational Thinking with Programming

Class Exercise 2

**Lecture Section**

1. What is an algorithm?

A process , sometimes complex, to accomplish a task

1. Write the python statement that will print ‘hello’.

Print(‘hello’)

1. What character in python is used to make a comment?

# or ‘’’

1. What is an example of an illegal variable name?

2,

A space

1. If a user enters a number when prompted by the input function, what variable type will it be stored as?

A string

**Creating Variables**

For the following problems, write the line of python code to create the following variables with the static values provided.

1. Write a line of code that stores the value **Marty** as a string into a variable called **name**.

Name = ‘Marty’

1. Write a line of code that stores the value **1955** as an integer into a variable called **year**.

Year = 1955

1. Write a line of code that stores the value **88.5** as a float into a variable called **mph**.

Mph = 88.5

**Gather User Input with the Input Function**

The input() function can prompt the user to enter information using a prompt within the parenthesis. The program will then pause to display the prompt and wait for the user to enter information and hit enter. The data they enter can be stored into a variable. For the problems in this section, use the input function to write a line of code that will gather user input and store it as the appropriate type.

1. Write a line of code that asks the user to “Enter your first name: “ and store the result into a variable called **first\_name** as a string.

First\_name = Input(‘Enter your first name: ‘)

1. Write a line of code that asks the user to “Enter a number: “ and stores the result into a variable called **num1** as an integer.

Num1 = int(input(‘Enter a number: ‘))

1. Write a line of code that asks the user to “Enter the price: “ and stores the result into a variable called **price** as a float.

Price = float(input(‘Enter the price: ‘))

**Manipulating Variables in Processing Steps**

For the following questions, write the line of python code that will create a variable using existing variables.

1. Assuming variables **num1** and **num2** are integers, write a line of code to store the sum of **num1** and **num2** in a variable called **sum**.

Sum = num1+num2

1. Assuming variable **first\_name** and **last\_name** are strings, write a line of code that stores the concatenated values of **first\_name** and **last\_name** with a space between them into a new variable called **full\_name**.

Full\_name = ‘{} {}’.format(first\_name, last\_name)

1. Assuming a variable **price** stores a float value and a variable **quantity** stores an integer, write a line of code that creates a new variable **total** and set it to the product of **price** and **quantity**.

Total = price \* quantity

**Printing Variables as Output**

For the following questions, write a line of python code to print out a description of the variable followed by the variable.

1. Write a print statement that prints “The sum is: “ followed by the value of a variable called **sum**.

Print(‘The sum is:’ + sum)

1. Write a print statement that prints “Hello “ followed by the value of a variable called **full\_name**.

Print(‘Hello’+full\_name)

1. Write a print statement that prints “Your total is: “ followed by the value of a variable called **total**.

Print(‘your total is:’+total)

For the final programming exercise, do the following as shown in the provided example:

* **Analyze the problem and provide a list of inputs, outputs and processing steps**
* **Create Test Cases / Example Inputs**
* **Create Pseudocode**
* **Create Python Code**
* **Show Test Results**

**Example from Lecture**

Create a program that works as follows: it should read in the sale price of an item, the sales tax rate, and print the sales tax, the total price to be paid including the sales tax. In addition, the program should echo the sale price and the sales tax rate.

|  |  |  |
| --- | --- | --- |
| **Inputs** | **Outputs** | **Processing** |
| sales\_price | sales\_price | sales\_tax = sales\_price \* tax\_rate |
| tax\_rate | tax\_rate | total\_price = sales\_price + sales\_tax |
|  | sales\_tax |  |
|  | total\_price |  |

**Test Case 1**

**Example Input**

Enter sale price: $250.00

Enter sales tax rate: 8%

**Expected Output:**

Enter sale price: $250.00

Enter sales tax rate: 8%

Sales tax $20

purchase price $270.00

**Test Case 2**

**Example Input**

Enter sale price: $300.00

Enter sales tax rate: 10%

**Expected Output:**

Enter sale price: $300.00

Enter sales tax rate: 10%

Sales tax $30

purchase price $330.00

**Pseudocode**

Get sales\_price

Get tax\_rate

Compute sales\_tax = sales\_price \* tax\_rate

Compute total\_price = sales\_price + sales\_tax

Print sales\_price, tax\_rate, sales\_tax, and total\_price

**Python Code**

# Get sales\_price

sales\_price = float(input("Enter Sales Price: "))

# Get tax\_rate

tax\_rate = float(input("Enter Tax Rate: "))

# Compute sales\_tax = sales\_price \* tax\_rate

sales\_tax = sales\_price \* tax\_rate

# Compute total\_price = sales\_price + sales\_tax

total\_price = sales\_price + sales\_tax

# Print sales\_price, tax\_rate, sales\_tax, and total\_price

print("Sales price:", sales\_price)

print("Tax rate:", tax\_rate)

print("Sales tax:", sales\_tax)

print("Total price:", total\_price)

**Test Results**

Text

Description automatically generated

**Programming Exercise**

Write a program that calculates the amount of a meal purchased at a restaurant. The program should ask the user to enter the cost of the meal. It should apply the sales tax of 7.125% and add that to the total. The program should print out the pretax cost, the tax, the total cost. It should also give suggested tips for 15%, 20% and 25% of the total cost.

|  |  |  |
| --- | --- | --- |
| **Inputs** | **Outputs** | **Processing** |
| Cost of meal | Pretax cost | Pretaxt=com\*tax |
|  | Tax | Total=pretax+com |
|  | Total cost |  |
|  | Suggested tips | Total\*.20 or.15 or.25 |
|  |  |  |

**Test Case 1**

**Example Input**

Meal cost: $10

**Expected Output:**

Pretax cost: .7125

Cost:10.7125

20% tip:2.1425

**Test Case 2**

**Example Input**

Meal cost: $20

**Expected Output:**

Pretax: 1.425

Cost: 21.425

20% tip: 4.285

**Pseudocode**

tax = .07125

com = input(‘Enter cost of meal: )

pretax = com \* tax

total = com+pretax

Grad1=total\*.15

Grad2=total\*.2

Grad3=total\*.25

print(‘The tax today was {}. Your total meal cost is {}. Purchase tax of {}.’.format(tax, total, pretax)

print(‘Tip suggestions: 15%: {}, 20%: {}. 25%: {}’.format(Grad1, Grad2, Grad3)

**Python Code**

**Test Results**

**A screenshot of a computer program

Description automatically generated**