Metropolitan State University

ICS 140 Computational Thinking with Programming

Class Exercise 2

**Lecture Section**

1. What is an algorithm?

A process/ set of rules and calculations

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

print(“hello”)

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

Hashtag/Octothorpe

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

An existing keyword like turtle if you are using the turtle library

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

A string

**Reading Pseudocode**

Examine each pseudo code fragment in problems and write what will be printed. Each problem starts by listing out the values that will be entered by the user. The pseudocode is between “begin” and “end” statements. When reading a line like “input a number into …” refer to the inputs above the code and imagine the values being entered in the order they are listed.

6. The user enters 7 as input.

begin

input a number into x

print x

end

Printed: 7

7. The user enters 7 as input.

begin

input a number into x

set y to x + 5

print y

end

Printed: 12

8. The following code prompts thrice for numbers. Suppose the user enters 6, 8, and 16 as

input for the three numbers.

begin

input a number into a

input a number into b

input a number into c

set x to (a + b + c) / 5

print x

end

Printed: 30

9. The following code prompts twice for numbers. The user enters 10 and then 20 for the

two numbers.

begin

input a number into p

input a number into q

set r to p + q

set s to r \* 3 – 2

print p + s

end

Printed: 98

10. The following code prompts twice for numbers. The user enters 13 and then 5 for the

two numbers.

begin

input a number into x

input a number into y

set z to 2 \* x + y

print (z + 9) / 4

end

Printed: 10

11. The following code prompts thrice for numbers. Suppose the user enters 6, 7, and 8 as

input for the three numbers.

begin

input a number into a

input a number into b

input a number into c

print (a + b + c) / 3

end

Printed: 7

For the programming exercises, 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** |
| Meal Cost | Pretax Cost |  |
|  | Tax | Sales price \* Tax rate |
|  | Total Cost | Total cost = Sale price + Tax |
|  | Tip for 15% | Tip15 = Total cost \* .15 |
|  | Tip for 20% | Tip20 = Total cost \* .20 |
|  | Tip for 25% | Tip25 = Total cost \* .25 |

**Test Case 1**

**Example Input**

Meal cost is $100

**Expected Output:**

Pretax Cost: $100

Tax Amount: $7.125

Total cost: $107.13

15% Tip: $16.875

20% Tip: $21.425

25% Tip: $26.781

**Test Case 2**

**Example Input**

Meal Cost: $45

**Expected Output:**

Pretax Cost: $45

Tax Amount: $3.21

Total Cost: $48.21

15% Tip: $7.23

20% Tip: $9.64

25% Tip: $12.05

**Pseudocode**

Get sales price from user

Tax = 0.07125

Calculate tax amount

Calculate total amount

Calculate 3 tip amounts (15%, 20%, 25%)

**Python Code**

Graphical user interface, text, application

Description automatically generated

**Test Results**

