CSCI.UA.0002
Midterm #1 - PRACTICE
Introduction to Computer Programming (Python)

Name: ______________________

NetID / Email: ______________________
1. Analyze the code below and identify any problems or issues that might exist. Offer suggestions on how to re-engineer the code to prevent these errors from occurring and/or rewrite the code so that it functions correctly.

```python
rate = str(input("How much do you make per hour? ' "))
hours = input("How many hours did you work this week? " )

if hours < 40:
    pay = rate * hours
if hours > 40
    pay = rate * 40
    ot_pay = (hours-40) ** (rate*1.5)

print ("Your total pay is, pay + ot_pay")
```

**SOLUTION:**

```python
rate = float(input("How much do you make per hour? " ))
hours = float(input("How many hours did you work this week? " ))

if hours < 40:
    pay = rate * hours
    final_pay = pay
else:
    pay = rate * 40
    ot_pay = (hours-40) * (rate*1.5)
    final_pay = pay + ot_pay

print ("Your total pay is", final_pay)
```
2. Given the following program:

```python
a = 5
b = 6
c = 20
d = 24

if a < b and b * 2 < c:
    print ("Python Case 1")
    print ("A", 't', "B", 't', "C")
    if a * 2 == c:
        print (a*2, 't', a*2, 't', a*2)
    elif a * 3 == c:
        print (a*3, 't', a*3, 't', a*3)
    elif a * 4 == c:
        print (a*4, 't', a*4, 't', a*4)
    else:
        print ('?', 't', '?', 't', '?')
else:
    print ("Python Case 2")
    print ("a", 't', "b", 't', "c")
    if b * 2 == d:
        print (b*2, 't', b*2, 't', b*2)
    elif b * 3 == d:
        print (b*3, 't', b*3, 't', b*3)
    elif b * 4 == d:
        print (b*4, 't', b*4, 't', b*4)
    else:
        print ('?', 't', '?', 't', '?')
```

What will be printed to the screen when the program is run?

**SOLUTION:**

Python Case 1
A  B  C
20  20  20
3. Write a program that lets the user figure out how many items they can purchase at a local coffee shop. Begin by asking the user to enter an amount of money as a float. Then ask the user to select a product from a pre-determined list. Figure out how many items the user can purchase, noting that the coffee shop does not sell fractional amounts (i.e. you can’t buy half a donut).

```
How much money do you have?: 10.00

What would you like to buy?
Donut (d) – 1.50
Coffee (c) – 1.00
Bagel (b) – 2.50
Scone (s) – 2.75

Enter your choice (d/c/b/s): d

You can purchase 6 donuts with $10.0
```

Note that you cannot assume that the user will enter a valid product (i.e. they could type in the string “donut” instead of the string “d”). In this case you will need to present the user with some kind of error (i.e. “Sorry, that’s not a valid product”) – you do not need to re-prompt them (you can just end the program). Also, you can assume that the user will input valid floating-point numbers when prompted.

**SOLUTION:**

```
money = float(input("How much money do you have? "))

print("What would you like to buy?"
print("Donut (d) – 1.50"
print("Coffee (c) – 1.00"
print("Bagel (b) – 2.50"
print("Scone (s) – 2.75"

choice = input("Enter your choice (d/c/b/s): ")

if choice == "d":
    print("You can purchase", int(money//1.50), "donuts with", money)
elif choice == "c":
    print("You can purchase", int(money//1.00), "coffee with", money)
elif choice == "b":
    print("You can purchase", int(money//2.50), "bagel with", money)
elif choice == "s":
    print("You can purchase", int(money//2.75), "scones with", money)
else:
    print("Sorry, that’s not a valid product")
```
4. Write a “calculator” program that asks the user for two numbers as well as an “operation code” ("a" for add, "s" for subtract, "d" for divide or "m" for multiply). Using the information provided perform the specified operation and print the result. Here is a sample running of the program:

Number 1: 2.0  
Number 2: 3.0  
Operation (a/s/d/m): add  
Invalid operation! Try again.  
Operation (a/s/d/m): a  
2.0 + 3.0 = 5.0

Note that you cannot assume that the user will enter a valid operation code (i.e. they could type in the string “multiply” instead of the string “m”). In this case you will need to present the user with some kind of error (i.e. “Sorry, that’s not a valid operation code”) and re-prompt them. However, you can assume that the user will input valid floating-point numbers when prompted.

Also note that dividing a number by 0 will result in a runtime error. Prevent this from happening in your program by providing special output in this case (i.e. 5.0 / 0.0 = undefined)

SOLUTION:

```python
# get 2 numbers  
num1 = float(input("Num 1: "))  
num2 = float(input("Num 2: "))  

# get an op code  
while True:  
    op = input("a/s/d/m: ")  
    if op == 'a' or op == 's' or op == 'd' or op == 'm':  
        break  
    else:  
        print ("Invalid, try again")  

# generate the answer  
if op == 'a':  
    print (num1, "+", num2, "=", num1+num2)  
elif op == 's':  
    print (num1, "-", num2, "=", num1-num2)  
elif op == 'd':  
    print (num1, "*", num2, "=", num1*num2)  
else:  
    if num2 == 0:  
        print (num1, "/", num2, "= undefined")  
    else:  
        print (num1, "/", num2, "=", num1/num2)
```
5. A small college has asked you to write a program for their admissions department to help them determine if a student should be accepted into their school. Write a program that uses the following criteria to determine whether a given applicant should be admitted:

- Combined SAT score of 1600 or more
- A high school GPA of 3.0 or higher
- At least 3 extracurricular activities

However, this particular school places a heavy emphasis on extracurricular activities, so students with 5 or more activities only need a 1400 combined score on their SAT and a GPA of 2.8. Comment your code as necessary. You can assume that the user will enter floating-point values.

Here is a sample running of your program. Note that you should ask the user if they want to repeat the process for additional students when you are finished.

Student name: Craig
Combined SAT Score: 1800
High school GPA: 3.2
# of extracurricular activities: 3
Craig should be admitted!
Another student? yes

Student name: John
Combined SAT Score: 1500
High school GPA: 3.1
# of extracurricular activities: 7
John should be admitted!
Another student? yes

Student name: Chris
Combined SAT Score: 1300
High school GPA: 2.9
# of extracurricular activities: 8
Chris should not be admitted.
Another student? no
SOLUTION:

```python
while True:
    name = input("Student name: ")
    sat = float(input("SAT: "))
    gpa = float(input("GPA: "))
    act = int(input("Activities: "))

    # case 1
    if sat >= 1600 and gpa >= 3.0 and act >= 3:
        print (name, "should be admitted!")

    # case 2
    elif act >= 5 and sat >= 1400 and gpa >= 2.8:
        print (name, "should be admitted!")

    else:
        print (name, "should not be admitted")

    again = input("Another student? ")
    if again == "no":
        break
```