Worksheet Answers by Robert Myers

Worksheet Week 4, 01 - Split My Bill

Predict

Take a look at the code below. Read it carefully and try to make a prediction about what might happen when this code is executed.

```
1   print("---Welcome to Split My Bill---")
2   print("What is the total bill?")
3   bill_total = float(input())
4   print("How many people are sharing?")
5   people = int(input())
6   print("What percentage tip would you like to leave?")
7   tip_percentage = int(input())
8   percentage_decimal = tip_percentage / 100
9   tip_total = bill_total * percentage_decimal
10  bill_total = bill_total + tip_total
11  cost_per_person = bill_total / people
12  print(f"Total bill including tip is £{bill_total}")
13  print(f"Total cost per person is £{cost_per_person}")
```

Write down your prediction below:

> The code will display how much the total bill is once inputted, how many people the total should be divided by once inputted, what percentage tip once inputted and then the bill total including percentage tip and the cost per person will be calculated by the program.

Run

Open and run the file with this code. Here's a copy of the program.

Was your prediction correct? Did anything unexpected happen? Write down your thoughts below:

The code worked up until percentage decimal in line 9 as I had made an error when copying the code across.

Investigate

- What is the first question that is asked by the program?

  What is the total bill?

- What data type is being used for the bill_total?

  Floating number

- Why is this data type needed for the bill_total?

  As it may include pence so needs to use decimals to calculate

- On line 5, what data type is being used for the number of people?

  integer

- Why is this data type being used?

  because the number of people can only be a whole number

- Line 7 is used to enter the percentage tip that the group would like to leave. What is happening at line 8?

the percentage is divided by 100 to work out the value of the tip

- What is calculated at line 9?

the bill total is multiplied by the percentage decimal to give the value of the tip

- On line 10, the variable bill_total is reassigned with the expression bill_total + tip_total. Describe what is happening here.

The bill total needs to include the tip so the two values of the tip total and the bill total are added together to give the real total.

- What type of error occurs (runtime/syntax/logic) when you enter hello for the first question?

Logic error

- What could you do to avoid this error from occurring?

Change line 3 from int to just input()

Modify

Modification	Hint
Lines 8 to 10 contain three separate arithmetic expressions that calculate the final total bill. Use your knowledge of BIDMAS to write a single expression that performs the same calculation.	Try writing the expression on a piece of paper first and testing it out with a calculator. Think about what will need to be calculated first and how you can use BIDMAS to make this happen. Use # hashtags in front of the original three lines of code so that you can read them for reference whilst testing your new line of code. #percentage_decimal = tip_percentage / 100

It is important that numbers are entered by the user instead of text. Add data validation checks at each data entry point. This will help to make the program more robust.

```
#tip_total = bill_total * percentage_decimal
#bill_total = bill_total + tip_total
```

Test the code using simple numbers like 100 for the bill, 4 people, and 10 percent tip. This will make it easier to check for errors by performing the calculations in your head.
Brackets are important!

Here is a reminder of the 'try and except' code that you saw in lesson 4:

```
print("Enter a number")
try:
    number = int(input())
except ValueError:
    print("You must enter a number")
    number = int(input())
```

```
print("---Welcome to Split My Bill---")
while True:
    try:
        print("What is the total bill?")
        bill_total = float(input())
        break
    except ValueError:
        print("You must enter a number. Please try again.")
while True:
    try:
        print("How many people are sharing?")
        people = int(input())
        break
    except ValueError:
        print("You must enter a number. Please try again.")
while True:
    try:
        print("What percentage tip would you like to leave?")
```

```
            tip_percentage = int(input())
            break
        except ValueError:
            print("You must enter a valid number. Please try again.")
    bill_total *= (1 + tip_percentage / 100)
    cost_per_person = bill_total / people
    print(f"Total bill including tip is £{bill_total:.2f}")
    print(f"Total cost per person is £{cost_per_person:.2f}")
```

Make

Due to the success of the ‘Split my bill’ app, you have been asked to create a new app called ‘Split my pizza’. This will tell the user how to evenly divide a pizza between their group of friends.

The app should:

- Ask for the number of slices on the pizza
- Ask how many people are sharing the pizza
- Reveal how many slices each
- Reveal if there will be slices remaining

Hint: You will need to use mod % and integer division // for this program. Here is an example of integer division and mod being used for counters. You could apply this to your own solution:

counters_each = 10//3
counters_remaining = 10%3

Copy your code into the box below:

```
# Welcome message
print("--- Welcome to Split My Pizza! ---")
print()
# Get number of slices
while True:
    try:
        slices = int(input("How many slices are on the pizza? "))
```

```
        if slices < 1:
            print("Please enter a number greater than 0")
            continue
        break
    except ValueError:
        print("That's not a valid number. Please try again")
print()  # Add space between questions
# Get number of people
while True:
    try:
        people = int(input("How many people are sharing? "))
        if people < 1:
            print("Please enter a number greater than 0")
            continue
        break
    except ValueError:
        print("That's not a valid number. Please try again")
print("\n--- Results ---")  # Section separator
# Calculate and show results
slices_per_person = slices // people
leftover_slices = slices % people
print(f"Each person gets: {slices_per_person} slices")
print(f"Leftover slices: {leftover_slices}")
```

Explorer task

The app could also:

- Incorporate the ‘Split my bill’ code by working out how much each person needs to pay for their share of the pizza

Copy your code into the box below:

```
print("--- Welcome to Split My Pizza! ---")
print()
while True:
    try:
        slices = int(input("How many slices are on the pizza? "))
        if slices < 1:
            print("Please enter a number greater than 0")
            continue
        break
    except ValueError:
        print("That's not a valid number. Please try again")
print()
while True:
    try:
        people = int(input("How many people are sharing? "))
        if people < 1:
            print("Please enter a number greater than 0")
            continue
        if slices % people != 0:
            print(f"{slices} slices cannot be evenly split among {people} people. Please try again.")
            continue
        break
    except ValueError:
        print("That's not a valid number. Please try again")
print()
```

```
while True:
    try:
        total_cost = float(input("What is the total cost of the pizza? £"))
        if total_cost <= 0:
            print("Please enter a positive number.")
            continue
        break
    except ValueError:
        print("That's not a valid number. Please try again")
print("\n--- Results ---")
slices_per_person = slices // people
cost_per_slice = total_cost / slices
cost_per_person = slices_per_person * cost_per_slice
print(f"Each person gets: {slices_per_person} slices")
print(f"Cost per slice: £{cost_per_slice:.2f}")
print(f"Each person must contribute: £{cost_per_person:.2f}")
```