

## CS21 Assignment #6

Please use the given name for your scripts!

1. (expenses.py) According to its documentation, the 2021 MINI Cooper gets 28 mpg in the city and 38 mpg on the highway. Write a program to compute the total cost of gasoline used during your most recent trip. In `main()`, prompt the user for two floats: a) total miles driven and b) percentage of total miles driven on a highway. Be sure to validate user input: total miles driven should be positive, and percentage spent in highway driving should be a value between 0 and 100. `main()` should prompt the user for new trip data until user is done. `main()` is also responsible for displaying the trip information.

You must use the following two user-defined functions:

Function Name	Input	Processing	Output
<code>total_gallons</code>	total miles, highway percentage	Computes the total gas consumption (gallons) according to this formula below. Uses two CONSTANTS, one each for city and highway mpg.	The gas consumption

$$total\_gas\_consumption = \frac{total\_highway\_miles}{MPG\_HWY} + \frac{total\_city\_miles}{MPG\_CITY}$$

Function Name	Input	Processing	Output
<code>gas_expense</code>	total gallons	Computes the total spent on gasoline for this trip. Use a CONSTANT price of 2.29 per gallon	The total spent on gas

### Sample Run #1

```
Computing your gasoline expenses...
```

```
Total miles driven: 367
```

```
Percentage of total miles driven on a highway: 50
```

```
Here is the information for your trip:
```

```
Total miles: 367.0
```

```
Gas consumption: 11.4 gal
```

```
Total cost: $ 26.07
```

```
Compute gas expense for another trip (y or n)? n
```

## Sample Run #2

Computing your gasoline expenses...

Total miles driven: -5

Enter a value > 0: 5

Percentage of total miles driven on a highway: 20

Here is the information for your trip:

Total miles: 5.0

Gas consumption: 0.2 gal

Total cost: \$ 0.39

Compute gas expense for another trip (y or n)? y

Total miles driven: 1080

Percentage of total miles driven on a highway: 80

Here is the information for your trip:

Total miles: 1080.0

Gas consumption: 30.5 gal

Total cost: \$ 69.73

Compute gas expense for another trip (y or n)? n

2. (game21.py) Write a program that plays the game of 21 with the user. The game consists of rounds. In each round, the user is asked if they'd like to roll (2 six-sided die). If they agree, the user rolls the die and the computer rolls their die. Their rolls are added to their individual totals. The user's total is displayed at the end of each round; the computer's total is hidden.

Rounds continue as long as the user indicates they would to roll and the user hasn't reached 21. Look carefully at the sample runs provided. If both computer and user exceed 21, the game is a tie.

**You must use two user-defined functions that meet the following specifications:**

Function Name	Input	Processing	Output
roll_dice	none	Simulate the rolling of two dice	The dice roll (return two values)

Refer to page 260 for information on returning multiple values.

Function Name	Input	Processing	Output
get_response	none	Prompts the user "do you want to roll?" Accepts only 'y' or 'n' as a valid response.	Returns valid response.

#### **Sample Run – the game ends because user exceeded 21**

```
Do you want to roll? y
Points: 8
Do you want to roll? y
Points: 15
Do you want to roll? y
Points: 22
User's points: 22
Computer's points: 20
Computer wins
```

#### **Sample Run – user chose to quit hoping they had won (wrong!)**

```
Do you want to roll? y
Points: 9
Do you want to roll? y
Points: 18
Do you want to roll? n
User's points: 18
Computer's points: 20
Computer wins
```

#### **Sample Run – user chose to quit hoping they had won (correct this time!)**

```
Do you want to roll? y
Points: 4
Do you want to roll? y
Points: 8
Do you want to roll? y
Points: 16
Do you want to roll? n
User's points: 16
Computer's points: 30
User wins
```

#### **Sample Run – game ends because user hit 21 – computer exceeded 21**

```
Do you want to roll? y
Points: 10
Do you want to roll? y
Points: 16
Do you want to roll? y
Points: 21
User's points: 21
Computer's points: 27
User wins
```

#### **Sample Run – user quits before starting**

```
Do you want to roll? n
User's points: 0
Computer's points: 0
Tie Game!
```

**Reminders (not following will result in point deductions):**

If a function's task doesn't include output to the user, do not do it!

All programs should have a `main()` function

Use constants! No magic numbers!

We expect you to apply the same process of development as we use in class. When you reach the point of having an algorithm (pseudocode), this will become the comments of your program, the starting point for writing code. Comment first, then code!

Be sure to include comments at the top of the program that include your name, class and a short description of the program.

Each function should begin with a comment describing the task the function will perform.

Be sure all output is formatted. Unless otherwise, specified, displays non-integer values with 2 digits after the decimal point.

*Any work you submit for this assignment should be authored entirely by yourself. Assistance is permitted from the instructor or teaching assistants only. All submitted programming assignments are subject to originality verification through software designed and used for the Measure Of Software Similarity (MOSS).*