Practice Problems for PE02

For PE02, you'll complete two short programming problems with **selection**. These are similar to the Codingbat or PracticeIt exercises you may have completed in Java or Python. Below are some sample problems that you can use for practice.

1 The Blue Ticket Problem

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of the numbers in each pair. If any pair sums to exactly 10, the result is 10. Otherwise if the ab sum is exactly 10 more than either bc or ac sums, the result is 5. Otherwise the result is 0. You will print the result. Here are some samples.

- input of 9, 1, 0 → 10
- input of 9, 2, 0 → 0
- input of 6, 1, 4) → 10

2 The Sum Limit Problem

Given 2 non-negative ints, a and b, print their sum, so long as the sum has the same number of digits as a. If the sum has more digits than a, just return a without b.

- input of 2, 3 → 5
- input of 8, 3 → 8
- input of 8, 1 → 9

3 The Green Ticket Problem

You have a green lottery ticket, with ints a, b, and c on it. If the numbers are all different from each other, the result is 0. If all of the numbers are the same, the result is 20. If two of the numbers are the same, the result is 10.

- input of 1, 2, 3 → 0
- input of 2, 2, 2 → 20
- input of 1, 1, 2 → 10

4 THE RED TICKET PROBLEM

You have a red lottery ticket showing ints a, b, and c, each of which is 0, 1, or 2. If they are all the value 2, the result is 10. Otherwise if they are all the same, the result is 5. Otherwise so long as both b and c are different from a, the result is 1. Otherwise the result is 0.

- input of 2, 2, 2 → 10
- input of 2, 2, 1 → 0
- input of 0, 0, 0 → 5

5 THE MAX MOD FIVE PROBLEM

Given two int values, print whichever value is larger. However, if the two values have the same remainder when divided by 5, then the print the smaller value. However, in all cases, if the two values are the same, print 0.

- input of 2, 3 → 3
- input of 6, 2 → 6
- input of 3, 2 → 3

6 THE NO DOUBLES PROBLEM

Print the sum of two 6-sided dice rolls, each in the range ..6. However, if noDoubles (the third value input) is true, and, if the two dice show the same value, increment one die to the next value, wrapping around to 1 if its value was 6. Here are some examples.

- input of 2, 3, true → 5
- input of 3, 3, true → 7
- input of 3, 3, false → 6

7 THE FIZZ BUZZ TOO PROBLEM

Given an int n, print the number followed by "!". So the int 6 prints "6!". Except if the number is divisible by 3 use "Fizz" instead of the number, and if the number is divisible by 5 use "Buzz", and if divisible by both 3 and 5, use "FizzBuzz". Do not put the quotes around your output. I will do that in the problem.

- input of 1 → "1!"
- input of 2 → "2!"
- input of 3 → "Fizz!"

8 THE FIZZ STRING PROBLEM

Given an input string str, if the string starts with "f" (either upper or lowercase), print "Fizz". If the string ends with "b" (either upper or lowercase), print "Buzz". If both the "f" and "b" conditions are true, print "FizzBuzz". In all other cases, print the string unchanged. Do not put the quotes around your output. I will do that in the problem.

- input of "fig" → "Fizz"
- input of "dib" → "Buzz"
- input of "fib" → "FizzBuzz"

9 THE TEA PARTY PROBLEM

We are having a party with amounts of tea and candy. Print the outcome of the party as "bad", "good" or "great". A party is good if both tea and candy are at least 5. However, if either tea or candy is at least double the amount of the other one, the party is great. However, in all cases, if either tea or candy is less than 5, the party is always bad.

- input of 6, 8 → "good"
- input of 3, 8 → "bad"
- input of 20, 6 → "great"

10 THE TEEN SUM PROBLEM

You are given 2 ints, a and b; print their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a teen, just print 19.

- input of 3, 4) → 7
- input of 10, 13) → 19
- input of 13, 2) → 19

11 THE ALARM CLOCK PROBLEM

Given as input a day of the week encoded as 0=Sun, 1=Mon, 2=Tue, ...6=Sat, and a boolean indicating if we are on vacation, print a string of the form "7:00" indicating when the alarm clock should ring. Weekdays, the alarm should be "7:00" and on the weekend it should be "10:00". Unless we are on vacation–then on weekdays it should be "10:00" and weekends it should be "off". Don't put quotes around your answer. I will do that.

- input of 1, false → "7:00"
- input of 5, false → "7:00"
- input of 0, false → "10:00"

12 The Sorta Sum Problem

Given 2 ints, a and b, print their sum. However, sums in the range 10..19 inclusive, are forbidden, so in that case just print 20.

- input of 3, 4 → 7
- input of 9, 4 → 20
- input of 10, 11 → 21

13 The Too Fast Problem

You are driving a little too fast, and a police officer stops you. Write code to compute the result, encoded as an int value: 0=no ticket, 25=small ticket, 275=big ticket. If speed is 60 or less, there is no ticket. If speed is between 61 and 80 inclusive, the result is a small ticket. If speed is 81 or more, the result is a large ticket. Unless it is your birthday-on that day, your speed can be 5 higher in all cases.

- input of 60, birthday=false → 0
- input of 65, birthday=false → 25
- input of 65, birthday=true → 0

14 The Fashion Problem

You and your date are trying to get a table at a restaurant. The first input ("you") is the stylishness of your clothes, in the range 0..10, and the second ("date") is the stylishness of your date's clothes. The result getting the table is encoded as "no", "maybe", or "yes". If either of you is very stylish, 8 or more, then the result is yes. With the exception that if either of you has style of 2 or less, then the result is no. Otherwise the result is maybe.

- input of 5, 10 → "yes"
- input of 5, 2 → "no"
- input of 5, 5 → "maybe"

15 The Lone Sum Problem

Given 3 int values, a b c, print their sum. However, if one of the values is the same as another of the values, it does not count towards the sum.

- input of 1, 2, 3 → 6
- input of 3, 2, 3 → 2
- input of 3, 3, 3 → 0

16 THE LUCK SUM PROBLEM

Given 3 int values, a b c, print their sum. However, if one of the values is 13 then it does not count towards the sum and values to its right do not count. So for example, if b is 13, then both b and c do not count.

- input of 1, 2, 3 → 6
- input of 1, 2, 13 → 3
- input of 1, 13, 3 → 1

17 THE NO TEEN SUM PROBLEM

Given 3 int values, a b c, print their sum. However, if any of the values is a teen -in the range 13..19 inclusive- then that value counts as 0, except 15 and 16 do not count as a teens. You may write a separate helper function if you like. Define the helper above the problem function.

- input of 1, 2, 3 → 6
- input of 2, 13, 1 → 3
- input of 2, 1, 14 → 3

18 THE ROUND SUM PROBLEM

Given 3 ints, a b c, return the sum of their rounded values. For this problem, we'll round an int value up to the next multiple of 10 if its rightmost digit is 5 or more, so 15 rounds up to 20. Alternately, round down to the previous multiple of 10 if its rightmost digit is less than 5, so 12 rounds down to 10. To avoid code repetition, you may write a separate helper function but that is not required. The helper should appear before the tested program.

- input of 16, 17, 18 → 60
- input of 12, 13, 14 → 30
- input of 6, 4, 4 → 10

19 THE BLACKJACK PROBLEM

Given 2 int values greater than 0, print whichever value is nearest to 21 without going over. Print 0 if they both go over.

- input of 19, 21 → 21
- input of 21, 19 → 21
- input of 19, 22 → 19

20 The Sees Candy Problem

We want to pack up a box of custom chocolate bars. We have some small chocolates (1 gram each) and some large chocolates (5 grams each). Each box will have a goal. Print the number of small bars to use, assuming we always use big bars before small bars. Print -1 if it can't be done.

- for input of small=4, large=1, goal=9 → 4
- for input of small=4, large=1, goal=10 → -1
- for input of small=4, large=1, goal=7 → 2

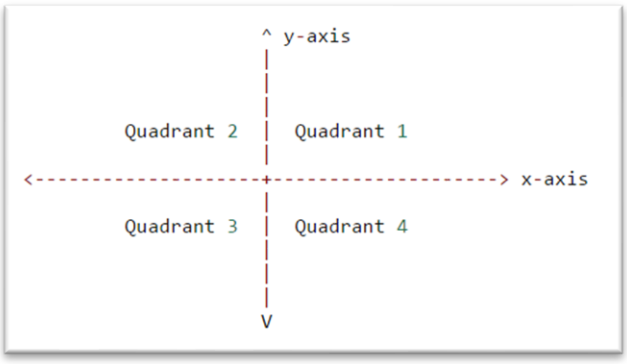
21The Triangle Type Problem

Given three integers (a, b and c) representing the lengths of the sides of a triangle, return what type of triangle it is. The three types are equilateral, isosceles, and scalene. An equilateral triangle has all three sides the same length, an isosceles triangle has two sides the same length, and a scalene triangle has three sides of different lengths. Here are some examples:

- for input of 5, 7, 7 →isosceles
- for input of 6, 6, 6 →equilateral
- for input of 5, 7, 8 →scalene
- for input of 12, 18, 12 →isosceles

22The Quadrant Problem

Given a pair of real numbers representing an (x, y) point, print the quadrant number for that point. Recall that quadrants are numbered as integers from 1 to 4 with the upper-right quadrant numbered 1 and the subsequent quadrants numbered in a counter-clockwise fashion:



Notice that the quadrant is determined by whether the x and y coordinates are positive or negative numbers. If a point falls on the x-axis or the y-axis, then quadrant is 0.

Here are some samples:

- for input of 12.4, 17.8 → 1
- for input of -2.3, 3.5 → 2
- for input of -15.2, -3.1 → 3
- for input of 4.5, -42.0 → 4
- for input of 0.0, 3.14 → 0

23 The Unique Ints Problem

Given three integers (a, b, and c), print the number of unique values among the three. For example:

- for input of 18, 3, 4 → 3
- for input of 6, 7, 6 → 2

24 The Days In A Month Problem

Given an integer as input, representing a month (1 for January, 2 for February, and so on), print the number of days in that month in a non-leap-year (that February always has 28 days).

Month	1 Jan	2 Feb	3 Mar	4 Apr	5 May	6 Jun	7 Jul	8 Aug	9 Sep	10 Oct	11 Nov	12 Dec
Days	31	28	31	30	31	30	31	31	30	31	30	31

25 The Simple Tax Problem

Given a salary as input, print the amount of tax you would owe if you make that salary. The tax is based on your tax bracket as found from the first two columns below. Once you know which row to use, start with the "flat amount" and add the "plus %" of the amount over the amount listed in the final column. For example, if your income is $50,000, then you use the third row of the table and compute the tax as $4,000 plus 25% of the amount over $29,050, which comes to $9,237.50. The total tax on $27,500 is $3,767.50. For $6,000, the tax is $600. For $120,000, the tax is $28,227.

over	but not over	flat amount	plus %	of excess over
$0	$7,150	$0	10%	$0
$7150	$29,050	$715	15%	$7,150
$29,050	$70,350	$4000	25%	$29,050
$70,350	*unlimited*	$14,325	28%	$70,350

26 THE MOVIE PROBLEM

You're thinking about going with your friends to a movie. Given two inputs: the cost of a ticket in dollars, and the number of stars the movie received out of 5, you should print console output about how interested you are; "very interested", "sort-of interested", or "not interested", based on the following criteria:

- You like bargains. A movie that costs less than $5.00 is one that you want to see very much.
- You dislike expensive movies. You are not interested in seeing any movie that costs $12.00 or more, unless it got 5 stars (and even then, you are only sort-of interested).
- You like quality. You are very interested in seeing 5 star movies that cost under $12.00.
- You are sort-of interested in seeing movies costing between $5.00 - $11.99 that also got between 2-4 stars inclusive.
- You are not interested in seeing any other movies not described previously.

27 THE GETGRADE PROBLEM

Write a function that accepts an integer representing a student's grade in a course and returns that student's numerical course grade. The grade can be between 0.0 (failing) and 4.0 (perfect). Assume scores are in the range of 0 to 100 and that grades are based on the following scale:

Score	Grade
<60	0.0
60-62	0.7
63	0.8
64	0.9
65	1.0
...	
92	3.7
93	3.8
94	3.9
>=95	4.0