1. Warm-Up Example:

   Given a circle's point of origin (i, j) and a point along its circumference (x, y), the radius of the circle can be computed using this formula:

   $$r = \sqrt{(x - i)^2 + (y - j)^2}$$

   Write a python program to input values for $(i.j)$ and (x, y) and use the above formula to output the radius to two decimal places. For example:

   ```
   Please enter the x co-ordinate of the origin(i): 2
   Please enter the y co-ordinate of the origin(j): 2
   Please enter the x co-ordinate of the point(x): 4
   Please enter the y co-ordinate of the point(y): 4

   The radius of the circle is: 2.83 units
   ```

2. Example One:

A magic square is a square in which the sums of all the number in each row, column and major diagonal are the same. For example, the following is a magic square in which all sums equal 34, the magic number:

```
12    20    -5     7
 4     6     4    20
 9    14    10     1
 9    -6    25     6
```

One method of constructing a magic square is the following. Given values for A, B, C, D, W, X, Y, Z, the contents of the square will be:

```
A-W        C+W+Y     B+X-Y     D-X
D+W-Z      B         C         A-W+Z
C-X+Z      A         D         B+X-Z
B+X        D-W-Y     A-X+Y     C+W
```

Write a python program to input values for A, B, C, D, W, X, Y, Z, and output the corresponding magic square in a formatted form. Also, compute and output the magic number. Your output must be well-labelled. For example:

```
Please Enter A: 3
Please Enter B: 6
Please Enter C: 5
Please Enter D: 2
Please Enter W: 4
Please Enter X: 16
Please Enter Y: 6
Please Enter Z: 10

The Magic Square is:

     -1        15        16       -14
     -4         6         5         9
     -1         3         2        12
     22        -8        -7         9

The magic number is: 16
```

3. Example Two:

   A computer cafe charges a fee to customers based on their computer usage per month. The fees are as follows:

Hours Used	Fee Charged
$1 < \text{hours} \leq 5$	Fee is a constant \$100
$5 < \text{hours} \leq 15$	Fee is a constant \$100, plus \$25 for every hour above 5 hours
$\text{hours} > 15$	Fee is a constant \$225, plus \$15 for every hour above 15 hours

   Write a python program that inputs the number of hours a customer used in a month and outputs the total charge the user incurs. For example:

   ```
   Enter the number of hours used in a month: 13
   The total charge for the month is: $300.00
   ```

4. Example Three:

A perfect number is a positive integer that is equal to the sum of its proper divisors. For example, 6 is the smallest perfect number, where the sum of its divisors is: $1 + 2 + 3 = 6$.

Write a python program that computes and prints all the perfect numbers from 5 to 1,000. For example:

```
All the perfect numbers between 5 and 1,000 are:
6
28
496
```

5. Example Four:

A security company is looking for a way to decrypt encoded messages. A message consists of a string of characters, where every third character is the character needed for the decrypted message.
Write a python program that takes in an encoded message from the user, extracts the correct characters, and outputs the decrypted message. For example:

```
Please enter the encoded message: qbhtlepglihlnvovb
The decrypted message is: hello
```

Your solution should include the following functions:

- decrypt(string) - takes as parameter the message as a string, and returns the decrypted message as a string

- main()

Note that a loop should be used to iterate over the string message for this problem. Also note that the last character of the encoded message may not be the last character of the decrypted message!

6. Example Five:

Write a python program to simulate the following dice game:

- Roll two six-sided dice
- If the sum of the two dice is 2, 3, or 12, the player loses
- If the sum of the two dice is 7 or 11, the player wins
- If the sum is any value other than 2, 3, 7, 11, or 12, then the player receives one point
- If a point is established, continue rolling the dice until either a 7 is rolled (in which case the player loses), or the point value is rolled (in which case the player wins)

Sample output 1:

```
You Rolled 6 + 5 = 11
You win!
```

Sample output 2:

```
You rolled 1 + 1 = 2
You lose!
```

Sample output 3:

```
You rolled 4 + 1 = 5
Point value = 5
You rolled 3 + 2 = 5
You win!
```

Sample output 4:

```
You rolled 6 + 2 = 8
Point value = 8
You rolled 4 + 2 = 6
You rolled 1 + 3 = 4
You rolled 4 + 4 = 8
You win!
```

Your solution should include the following functions:

- diceRoll() - returns the sum of the two randomly rolled six-sided dice
- main()

Note that the random module can be used for this problem!

7. Example Six:

Write a recursive python function to compute the sum of the following series:

$$m(n) = \frac{1}{3} + \frac{2}{5} + \ldots + \frac{6}{13} + \ldots + \frac{n}{2n+1}$$

Include a main function to test the recursive function using a user-input value for n.
For example:

```
Enter the number of terms to sum (n): 6
The sum of the first 6 terms is 2.5224
```