**Intro to programming II - PCR - fall 2015**

project 1: Rock, paper, scissors, lizard, Spock

Template: http://www.codeskulptor.org/#examples-rpsls_template.py

It's very simple
Scissors cuts paper
Paper covers rock
Rock crushes lizard
Lizard poisons Spock
Spock smashes scissors
Scissors decapitates lizard
Lizard eats paper
Paper disproves Spock
Spock vaporizes rock
And as it always has been...
Rock crushes scissors
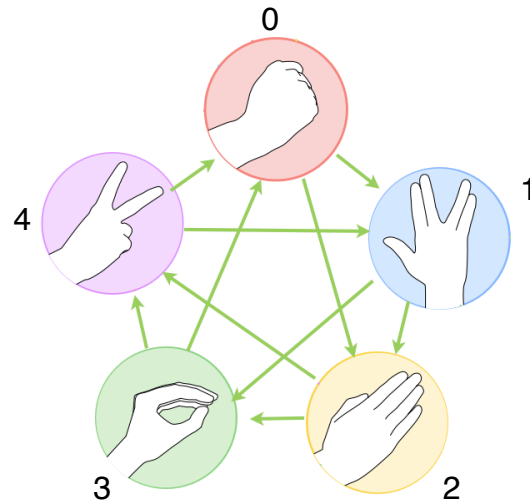
Rule: beats 2 counterclockwise opponents,
lose to 2 clockwise opponents

Our first project is to write the function *rpsls(name)* that takes a string, one of "rock", "paper", "scissors", "lizard", or "Spock". The function then simulates playing a round of rpsls by generating its own random choice from these alternatives and then determining the winner.

While we can determine the winner using 5x5=25 if/elif/else, it is simpler to determine the winner by assigning each of the five choices a number; using modular arithmetic, each choice wins against the preceding two choices and loses against the following two choices, e.g., scissors is 4 so it wins against the 2 and 3 (the preceding choices) and loses against the 0 and 1 (the following choices).

Writing our project:

1. Write *name_to_number(name)* that converts the string name into a number between 0 and 4. For example, *name_to_number("scissors")* returns 4.
2. Write *number_to_name(number)* that converts a number between 0 and 4 into its string. For example, *number_to_name(4)* returns "scissors"
3. Write the 1st part of *rpsls()* that prints a blank line to separate consecutive games, followed by a line that describes the player's choice. Then compute the number *player_number* between 0 and 4 by calling *name_to_number()* using *player_choice*.
4. Write the 2nd part of *rpsls()* that uses *random.randrange()* to generate the number *computer_number* between 0 and 4, and define *computer_choice* as the corresponding string, using *number_to_name(computer_number)*
5. Write the 3rd part of *rpsls()* that determines the winner, i.e., find the difference between *computer_number* and *player_number* **taken modulo 5**. Then write an if/elif/else whose conditions test who wins or whether there is a tie, and write the appropriate message.

The output should be formatted as follows:

```
Player choose rock
Computer choose rock
Player and computer tie!

Player choose Spock
Computer choose scissors
Player wins!

Player choose paper
Computer choose paper
Player and computer tie!

Player choose lizard
Computer choose Spock
Player wins!

Player choose scissors
Computer choose Spock
Computer wins!
```

Recall that....

randrange()

To use randrange() import the random library and then call the function as shown:

```
import random
```

```
random_number = random.randrange(a, b)
```

where a and b are two integers, a < b

Modular arithmetic

- a // b tells us how many times b fits in a, e.g., 14 // 5 = 2 because 5 fits twice in 14

- a % b tells us how much is left out, e.g., 14 % 5 = 4 because after we fit 5 in 14 twice we have 4 left, 14 - (5 x 2) = 4

- a % b is a number between 0 and b-1   # a % 5 will be 0, 1, 2, 3, or 4

- a = b * (a // b) + a % b   # for example,   14 = 2 * (14 // 5) + 14 % 5