Quiz 4

1. **(2pts)** Why would you choose to use threads instead of processes when writing an application?

2. **(2pts)** What is the difference between kernel and user thread managers? Which one does the python threading system resemble?

3. **(4pts)** Describle the problem with the code below and fix it to prevent the violation of the first law of thermodyamics while allowing the philosophers to eat as often as possible. (For 0.5pt extra credit, What is the first law of thermodyamics?)

```
import threading

chopsticks = []

class DiningPhilsophers():

   def __init__(self, num):

      global chopsticks

      chopsticks = [1] * num

      for i in range(num):

         t = DiningPhilosopher(i)

         t.start()

class DiningPhilosopher(threading.Thread):

   def __init__(self, id):

      self.id = id
```

```
def run(self):
   while True:
      think()
      trytoeat()
def trytoeat(self):
   global chopsticks
   #check left and right chopsticks
   if chopsticks[self.id] and chopsticks[self.id-1]:
      #pick up left chopstick
      chopsticks[self.id] -= 1
      #pick up right chopstick
      chopsticks[self.id-1] -= 1
      eat()
      #put down left chopstick
      chopsticks[self.id] += 1
      #put down right chopstick
      chopsticks[self.id-1] += 1
```