Question 1. (4 points) Consider the following Python code.

```python
i = n
while i > 1:
    for j in range(n * n):
        print(i, j)
    i = i // 2
```

What is the big-oh notation $O(\cdot)$ for this code segment in terms of $n$?

Question 2. (4 points) Consider the following Python code.

```python
for i in range(n):
    for j in range(n):
        print(j)
    for k in range(n):
        print(k)
```

What is the big-oh notation $O(\cdot)$ for this code segment in terms of $n$?

Question 3. (4 points) Consider the following Python code.

```python
def main(n):
    for i in range(n):
        doSomething(n)

def doSomething(n):
    for k in range(n):
        doMore(n)

def doMore(n):
    for j in range(n):
        print(j)

main(n)
```

What is the big-oh notation $O(\cdot)$ for this code segment in terms of $n$?

Question 4. (8 points) Suppose a $O(n^3)$ algorithm takes 10 second when $n = 100$. How long would the algorithm run when $n = 1,000$?

Question 5. (10 points) Why should any method/function having a "precondition" raise an exception if the precondition is violated?