COMP6010 Practical Week 6 solutions

1. Write a program to extract the digit of order k of the number n.
   Example: if n is 65498745 and k = 3 your algorithm should output 8.
   Indeed the digit of order 0 is 5, the digit of order 1 is 4, the digit of order 2 is 7 and so on.

   Hint: use a loop to do n/10 for k times, then calculate n%10.

Answer:

```
number = 76543210
length = len(str(number))
n = number
k = int(input("Enter an integer for k>=0 and k<=" + str(length-1) + ": "))
i = 1
while (i <= k):
  n = n//10
  i += 1
digit = int(n%10)
print("number = " + str(number))
print("The digit of order " + str(k) + " in " + str(number) + " is " +
str(digit))
```

2. Write a program to convert a decimal number to a binary.

Answer:

```
n = int(input("Enter a decimal: "))
result = ""
while n > 0:
  if n % 2 == 0:
    result = '0' + result
  else:
    result = '1' + result
  n = n // 2
print(result)
```

3. Write a program to output all prime numbers between 1 and 100.

Answer:

```
for number in range(1,100):
  numOfFactors = 0
  for factor in range(1, number+1):
    if number % factor == 0:
      numOfFactors += 1
  if numOfFactors == 2:
    print(str(number) + " is a prime.")
```

4. Assume a 3-digit number can be represented as $D_2D_1D_0$. There are some numbers where $D_2D_1D_0$= D_2^3+ D_1^3+D_0^3. For instance, 153=1^3+5^3+3^3 (note: 5^3=5*5*5).
 Write a program to output all this kind of 3-digit positive numbers.

Answer:
```
for i in range(1, 10):
  for j in range(0, 10):
    for k in range(0, 10):
      number = 100*i + 10*j + k
      if i*i*i + j*j*j + k*k*k == number:
        print(str(number))
```

5. For Q3, first define a Boolean function isPrime(), and then write a program to display all prime numbers between 1 and 100.

Answer:
```
import math

def isPrime(n):
  if n == 1:
      return False
  for i in range (2, (int)(math.sqrt(n)) + 1):
      if n%i == 0:
          return False
  return True

for number in range(1, 100):
  if (isPrime(number)):
    print(number)
```