Análisis, Diseño y Construcción de Software

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Lab 1: Python

1. Find the Number

Source code:

```
import random

from pip._vendor.distlib.compat import raw_input

number = random.randint(1, 30)
attempts = 0

file = "GuessingSteps.txt"
output = open("GuessingSteps.txt", "w")

def print_all(file_descriptor, text):
    file_descriptor.write(text + "\n")
    print(text)

print_all(output, "A random number between 1 and 30 was generated.")

def is_int(num):
    try:
        int(num)
        return True
    except ValueError:
        return False

while True:
    print_all(output, " ")
    n = raw_input("Guess a number between 1 and 30: ")
    output.write("Input: " + n + "\n")

    if n == "exit":
        print_all(output, "Exit Program")
        break

    if not is_int(n):
        print_all(output, "Please input a number.\n")
        continue

    guess = int(n)

    if guess > number:
        print_all(output, "Guess a lower number.")
        attempts = attempts + 1
    elif guess < number:
        print_all(output, "Guess a higher number.")
        attempts = attempts + 1
    else:
        print_all(output, "You are correct! The random number was " + str(number))
        attempts = attempts + 1
        print_all(output, "You made " + str(attempts) + " guesses.")
        break

output.close()
```

Runs:

1.
```
A random number between 1 and 30 was generated.

Guess a number between 1 and 30: 15
Guess a higher number.

Guess a number between 1 and 30: 22
You are correct! The random number was 22
You made 2 guesses.

Process finished with exit code 0
```

2.
```
A random number between 1 and 30 was generated.

Guess a number between 1 and 30: 15
Guess a lower number.

Guess a number between 1 and 30: 8
Guess a higher number.

Guess a number between 1 and 30: 12
Guess a lower number.

Guess a number between 1 and 30: 10
You are correct! The random number was 10
You made 4 guesses.

Process finished with exit code 0
```

3.
```
A random number between 1 and 30 was generated.

Guess a number between 1 and 30: 15
Guess a higher number.

Guess a number between 1 and 30: 22
Guess a lower number.

Guess a number between 1 and 30: 18
Guess a higher number.

Guess a number between 1 and 30: 20
Guess a higher number.

Guess a number between 1 and 30: 21
You are correct! The random number was 21
You made 5 guesses.

Process finished with exit code 0
```

2. Converter

Source code:

```
from pip._vendor.distlib.compat import raw_input

file = "Converter.txt"
output = open("Converter.txt", "w")

hex_map = {
   0: "0", 1: "1", 2: "2", 3: "3", 4: "4", 5: "5", 6: "6", 7: "7", 8: "8", 9: "9",
   10: "A", 11: "B", 12: "C", 13: "D", 14: "E", 15: "F"
}

def converter(num, base):
   if num == 0:
      return 0

   result = ""
   while num > 0:
      next_value = num % base
      num = int(num / base)
      next_digit = hex_map[next_value]
      result = next_digit + result

   return result

def print_all(file_descriptor, text):
   file_descriptor.write(text + "\n")
   print(text)

print_all(output, "Input a number greater than or equal to 0")

while True:
   input_val = raw_input("Input: ")
   output.write("Input: " + input_val + "\n")

   number = int(input_val)

   if number < 0:
      print_all(output, "The number you input must not be a negative number. Try again.")
      continue

   binary = converter(number, 2)
   hexadecimal = converter(number, 16)

   print_all(output, "Decimal: " + str(number))
   print_all(output, "Binary: " + str(binary))
   print_all(output, "Hexadecimal: " + str(hexadecimal))
   break

output.close()
```

Test Cases:

1.
```
Input a number greater than or equal to 0
Input: 0
Decimal: 0
Binary: 0
Hexadecimal: 0

Process finished with exit code 0
```

2.
```
Input a number greater than or equal to 0
Input: 1
Decimal: 1
Binary: 1
Hexadecimal: 1

Process finished with exit code 0
```

3.
```
Input a number greater than or equal to 0
Input: 5
Decimal: 5
Binary: 101
Hexadecimal: 5

Process finished with exit code 0
```

4.
```
Input a number greater than or equal to 0
Input: 10
Decimal: 10
Binary: 1010
Hexadecimal: A

Process finished with exit code 0
```

5.
```
Input a number greater than or equal to 0
Input: 16
Decimal: 16
Binary: 10000
Hexadecimal: 10

Process finished with exit code 0
```

6.
```
Input a number greater than or equal to 0
Input: 27
Decimal: 27
Binary: 11011
Hexadecimal: 1B

Process finished with exit code 0
```

7.
```
Input a number greater than or equal to 0
Input: 50
Decimal: 50
Binary: 110010
Hexadecimal: 32

Process finished with exit code 0
```

8.
```
Input a number greater than or equal to 0
Input: 100
Decimal: 100
Binary: 1100100
Hexadecimal: 64

Process finished with exit code 0
```

9.
```
Input a number greater than or equal to 0
Input: 128
Decimal: 128
Binary: 10000000
Hexadecimal: 80

Process finished with exit code 0
```

10.
```
Input a number greater than or equal to 0
Input: 682
Decimal: 682
Binary: 1010101010
Hexadecimal: 2AA

Process finished with exit code 0
```