Introduction to programming – ASSIGNMENTS 3

General instructions:

- Type in and test your programs using Python Idle.
- Bring in your answers to the next assignment (i.e. demonstration) session in memory stick, or save them to a web folder accessible in class. Alternatively, you can bring written answers with you, though this is not recommended.
- Remember to comment your code – this does NOT mean, that every single line should be commented. Comment the important parts in your program.
- Prepare to present your solution to the class.

1.

Write a program that queries the user for two strings and outputs the longer one.

Example run:

```
Give the 1st string: hello
Give the 2nd string: hey
hello is longer.
```

2.

Write a program that queries the user for two 4-character strings, and proceeds to test and output whether the first string contains all letters of the second string in reverse order.

Example run:

```
Give the 1st string: abcd
Give the 2nd string: dcba
abcd IS dcba in reverse order!
```

3.

Write a program that queries the user for three numbers and outputs the smallest of them.

Example run:

```
Give the 1st number: 4
Give the 2nd number: 11
Give the 3rd number: 7
4 is smallest.
```

4.

A parity bit is a bit which is added into beginning of a bit pattern to find transmission errors, so that the resulting pattern has an odd number of ones. Hence, if the original pattern has an odd number of ones, the parity bit added is a zero; if the original pattern has an even number of ones, the parity bit added is a one.

Write a program that queries the user for a bit pattern and outputs the bit pattern with parity bit added.

Example run 1:

```
Give a bit pattern: 01101
Parity bit added: 001101
```

Example run 2:

```
Give a bit pattern: 11001100
Parity bit added: 111001100
```

Hint: Handle the bit stream and the single bits as a string instead of a number!

5.

Write a program that queries the user for a string containing a DNA sequence, and proceeds to output the proportions of four nucleotide bases (A, C, G and T) as percentage values. You can assume that the user enters the sequence in lower case. If the user enters an empty string, display an error message.

Example run:

```
Enter sequence: aaaagctgcggta
Proportion of A: 38 percent
Proportion of T: 15 percent
Proportion of C: 15 percent
Proportion of G: 30 percent
```

6. * Expert assignment (double points)***

Write a program that queries the user for a 4-bit binary string and decodes it into decimal number.

Example run:

```
Give a 4-bit binary string: 1101
1101 is 13 as decimal number.
```

If the binary pattern given has more or less than 4 bits, the program should display an error message.

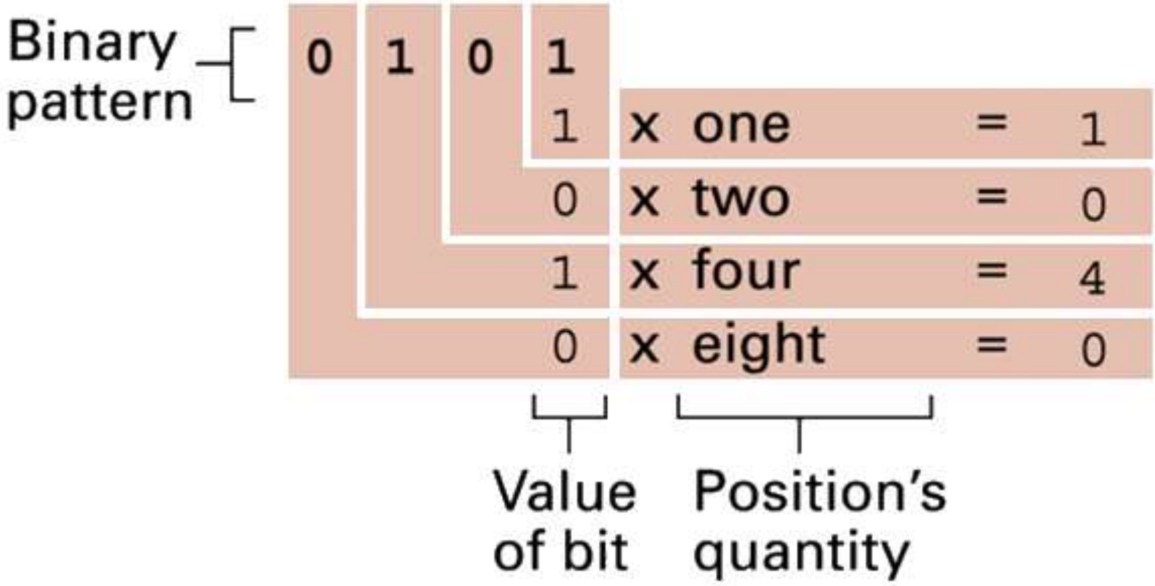

Figure 1 Decoding from binary representation