ENGG1330 Computer Programming

2018-19 2nd Semester

Tutorial 5

Deadline: 14/3 23:55

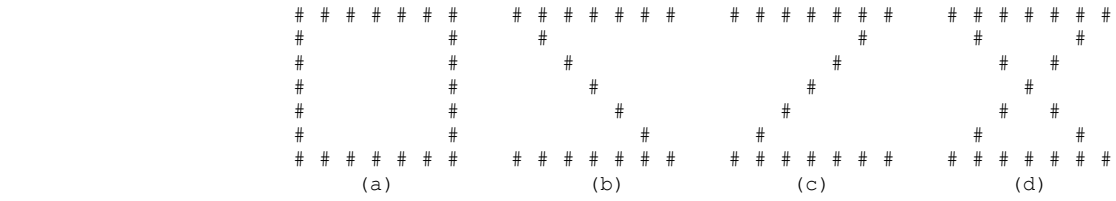
Aims and Objective:

1. Write program with flow control statement
2. Solve problem with functional programming

1. Print Patterns

   Write functions to print each of the followings patterns using nested loops. The heading of the function is:

```
# 'X' from 'A' to 'D', size is a positive integer.
def printPatternX(size):
```



   You may assume the size is always a positive odd number. Write a program which accepts a string, with one character only, indicates the pattern to print, and an integer, the size of the pattern.

Case	Input	Output
1	a 7	####### # # # # # # # # # # #######

2	b
	5
		#####
		  #
		  #
		  #
		#####

3	d 3	### # ###

2. Perfect Numbers:

A positive integer is called a perfect number if the sum of all its factors (excluding the number itself, i.e., proper divisor) is equal to its value.

For example, the number 6 is perfect because its proper divisors are 1, 2, and 3, and 6=1+2+3; but the number 10 is not perfect because its proper divisors are 1, 2, and 5, and 10≠1+2+5.

Write a function called isPerfect(posInt) that takes a positive integer, and return True if the number is perfect.

Using the function, write a program that prompts user for an upper bound (a positive integer), and lists all the perfect numbers less than or equal to this upper bound. The sample inputs and outputs are listed below:

Case	Input	Output
1	10	6
2	100	6 28
3	500	6 28 496