CS264 Assignment 1

haowu@cs.nuim.ie

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1 Submission Instructions

This assignment is **18%**, please upload your **source code** to moodle before **23:59, 08th-October**. Please note that your source code has to be **C++**, otherwise your submission will be automatically rejected.

2 Plagiarism

Zero-tolerance policy with plagiarism is applied to this assignment. If your submission is found to be copied from someone else's work or machine generated or downloaded from internet. 0 mark will be given immediately and a case will be reported to the Department and University.

3 Comments

Write a block of comments in your source code to explain how your algorithm works is a good routine for someone else to read your code. Hence, please briefly write some comments about how and why your algorithm works for each problem you try to solve (detailed proofs). The comments will be **10%** of this assignment.

4 Problems

4.1 Reverse an integer

Write a C++ program that reads in an integer from user's input and reverses it's value.

Input: 1234567 **Output:** 7654321

Input: -89356 **Output:** -65398

You may ignore overflow and underflow problems here.

4.2 Greatest Common Divisor

Write a C++ program that reads in two integers from user's input and calculates the greatest common divisor of two integers.

Input: 24 **Input:** 36 **Output:** 12

Input: 90 **Input:** 299 **Output :** 1

4.3 Palindrome Number

Write a C++ program that reads in an integer and checks if it is palindrome. An integer is palindrome when it reads the same backward as forward.

Input: 1221 **Output:** *true*

Input: -12221 **Output:** $false$
Explanation: From right to left, it is 12221-. Hence, it is not a palindrome.

4.4 Power Function

Implement a C++ power function $Pow(x, y)$ that has a time complexity of $O(\log\ n)$ without using C++ built-in power function. Write comments to show why it is $O(\log\ n)$.

Input: 2 **Input:** 3 **Output:** 8

Input: 1 **Input:** 200 **Output :** 1

4.5 Power of Two

Implement a C++ function that decides if an integer k ($k \geq 0$) is a power of two (without using C++ built-in power function).

Input: 128 **Output:** *true*

Input: 23 **Output:** $false$