CS264 Laboratory Session 1

Dr. John McDonald

29^{th} September 2015.

Deadline: All solutions to be submitted by 6pm Tuesday 6^{th} October 2015.

1 Lab objectives

In this lab you will learn to write simple C++ programs that make use of (i) primitive data types, (ii) the facilities of the iostream library, (iii) branching and looping control structures, and (iv) functions.

For this and future labs you should create a top level folder called CS264. For each individual lab you should create a sub-folder for saving your work for that lab (e.g. Lab1). Instructions will be given during the lab regarding submitting your work for grading.

2 Beginning C++ Programming

For each of the problems given below write a C++ program that provides a solution that problem. Each box provides a filename to use. Please ensure that you use those filenames. Failure to do so can result in loss of marks. **You should include a comment at the top of each source file with your name and student number.**

Exercise 1: Write a program that inputs three integers from the keyboard, and prints the sum, average, product, smallest and largest of these numbers. You should save the source in a file called `exercise1.cpp`.

Exercise 2: Write a program that reads in two integers and determines and prints if the first is a multiple of the second. You should save the source in a file called `exercise2.cpp`.

Exercise 3: Write a program that inputs a five-digit number, separates the number into its individual digits and prints the digits separated from one another by three spaces each. You should save the source in a file called `exercise3.cpp`.

Exercise 4: Develop a C++ program that will determine if a department-store customer has exceeded the credit limit on a charge account. For each customer, the following information is available:

1. account number (an integer);
2. balance at the beginning of the month;
3. total of all items charged by the customer this month;
4. total of all credits applied to the customer's account this month;
5. allowed credit limit

The program should input this information, calculate the new balance (= *beginning balance + charges - credits*) and determine if the new balance exceeds the customer's credit limit. For those customers whose credit limit is exceeded, the program should display the customer's account number, credit limit, new balance and the message "Credit limit exceeded."

The program should permit multiple customer details to be inputted with the above information being printed to the screen after each customer. The program should terminate when an account number of -1 is inputted.

You should save the source in a file called `exercise4.cpp`.

Exercise 5: An integer is said to be *prime* if it is divisible only by the two distinct factors 1 and itself. Write a function that determines if a number is prime. Use this function in a program that determines and prints all the prime numbers between 1 and 5000.

You should save the source in a file called `exercise5.cpp`.