

### CSE1301 Exercise Sheet 3 I/O, Selection, Iteration

(\* Important to complete)

#### Exercise 1

Suppose you have declared

```
char c1, c2;
```

Write C code that reads values into these variables. Write an if statement that prints "Somebody" if these characters correspond to the initials of a person in your tutorial class, and "Nobody" otherwise.

Note: Until you get to your tutorial, just use any initials to practice.

#### Exercise 2\*

Write a C program that does the following:

1. reads the type of a vehicle exiting a car park (C for car, B for bus and T for truck) and the number of hours spent in the car park.
2. calculates the parking fee given the following rates (GST included):
  - Car: \$0.70/hr for the first 2 hours; \$2.50/hr after 2 hours
  - Bus: \$1.50/hr for the first 3 hours; \$2.00/hr after 3 hours
  - Truck: \$2.50/hr for the first hour; \$3.25/hr after 1 hour
3. prints a request for payment that states the total parking fee owed.

#### Exercise 3\*

Write an algorithm that computes the sum of the geometric progression

$$a + ar + ar^2 + ar^3 + \dots + ar^n \text{ where } |r| < 1$$

Code your algorithm in C using an iteration method.

Consider the effect of a real valued  $r$  and of a large  $n$  on the type of the variable which stores the result and on the conversion specifiers required to print the result.

Note: this sum can actually be computed using closed form with the formula  $a \frac{1-r^{n+1}}{1-r}$

#### Exercise 4

Euclid's algorithm for calculating the greatest common divisor (GCD) of two positive integers was developed in 300 BC. Euclid's algorithm is based on the observation that

$$GCD(x, y) = \begin{cases} GCD(y, \text{remainder of } x/y), & \text{if } y > 0 \\ x, & \text{if } y = 0 \end{cases}$$

For example,  $GCD(24,9) = GCD(9,6) = GCD(6,3) = GCD(3,0) = 3$ .

Implement this algorithm in C.

#### Exercise 5

Write an algorithm to read in a positive integer,  $n$  (in the range 2 to 12), and from this produce the N-times table up to times 12. The output should be of the form:

```
1 x n = p
2 x n = q
...
12 x n = z
```

Code this algorithm in C.