EEET2601 Engineering Computing 1

Revision Exercises

1. Identify and explain the errors in the following declarations.

```
const int SIZE = 4;
int a[SIZE] = {0, 2, 2, 3, 4};
int b[SIZE – 5];
int c[3.0];
```

2. What will get printed? Explain.

```
printf("%c%c%c%c%c!\n", "ghi"[1], *("def" + 1),
                        *"abc" + 11, "klm"[1], *"ghi" + 8);
```

3. In the following program the invocation of `change_it()` seems to have no effect. Explain.

```
#include <stdio.h>

void change_it(int []);

int main() {
    int a[5], *p;
    p = a;
    printf("p has the value %p\n", p);
    change_it(a);
    p = a;
    printf("p has the value %p\n", p);
    return 0;
}

void change_it(int a[]) {
    int i = 777, *q = &i;
    a = q;
}
```

4. What will get printed? Explain.

```
#include <stdio.h>

int z;

void f(int x) {
    x = 2;
    z += x;
}

int main() {
    z = 5;
    f(z);
    printf("z= %d\n", z);
    return 0;
}
```

5. Use suitable loops to write a program that prints a multiplication table like this (https://www.mathsisfun.com/multiplication-table-10-bw.html).

6. Write a function that takes an array of integers as parameters and returns the largest element in the array.

7. Write a recursive function that takes an array of integers as parameters and returns the sum of the elements in the array.

8. Implement your own version of the C library function `int atoi(const char *str)` which converts the string `str` to an integer and returns it. If no valid conversion could be performed, the function returns zero.

9. Write a function `char *strdate(const char *src, char *dest)` which takes the string `src` in the format `"mm/dd/yyyy"` and produces the string `dest` in the format `"dd Month yyyy"`. The function finally returns the string `dest`. Assume that the string `src` is always in a correct format and valid.

10. Write a program to find the longest word in the book Alice's Adventures in Wonderland (https://www.gutenberg.org/files/11/11-0.txt). Please put the book in the same directory containing your program. Note that words are sequences of characters separated by whitespaces, which can be checked with the function **`isspace()`** from the C standard library.

11. Write a program to find the number of times the word "Holmes" appears in the book The Adventures of Sherlock Holmes (https://www.gutenberg.org/files/1661/1661-0.txt). Please put the book in the same directory containing your program.

12. Put a list of student last names, student id, and letter grades into a file called **`data`**. For example, the beginning of the file might look like:

    ```
    Nguyen    1234567     DI
    Smith     3459573     HD
    Jones     5287835     CR
    …
    ```

    Write a program called **`reorder`** that reads the data in the file and puts it into the array of type **`struct student`**. The program then prints out an ordered list of students and grades. Students with HD grades should be listed first, students with DI grades next, and so forth. Among all students having the same grade, the students should be listed alphabetically by last name. Assume that there are maximum 1000 students in the file.

    The program is to run as **`$ ./reorder data`**