York University
Electrical Engineering and Computer Science

EECS2031: Software Tools
SU2016
Assignment #6

Chapter 12: Exercises

1. Suppose that the following declarations are in effect:

```
int a[] = {5, 15, 34, 54, 14, 2, 52, 72};
int *p = &a[1], *q = &a[5];
```

(a) What is the value of `*(p+3)`?
(b) What is the value of `*(q-3)`?
(c) What is the value of `q - p`?
(d) Is the condition `p < q` true or false?
(e) Is the condition `*p < *q` true or false?

4. Rewrite the `make_empty`, `is_empty`, and `is_full` functions of Section 10.2 to use the pointer variable `top_ptr` instead of the integer variable `top`.

5. Suppose that `a` is a one-dimensional array and `p` is a pointer variable. Assuming that the assignment `p = a` has just been performed, which of the following expressions are illegal because of mismatched types? Of the remaining expressions, which are true (have a nonzero value)?

(a) `p == a[0]`
(b) `p == &a[0]`
(c) `*p == a[0]`
(d) `p[0] == a[0]`

6. Rewrite the following function to use pointer arithmetic instead of array subscripting. (In other words, eliminate the variable `i` and all uses of the `[]` operator.) Make as few changes as possible.

```
int sum_array(const int a[], int n)
{
  int i, sum;

  sum = 0;
  for (i = 0; i < n; i++)
    sum += a[i];
  return sum;
}
```

17. Rewrite the following function to use pointer arithmetic instead of array subscripting. (In other words, eliminate the variables `i` and `j` and all uses of the `[]` operator.) Use a single loop instead of nested loops.

```
int sum_two_dimensional_array(const int a[][LEN], int n)
{
  int i, j, sum = 0;

  for (i = 0; i < n; i++)
    for (j = 0; j < LEN; j++)
      sum += a[i][j];

  return sum;
}
```

Chapter 12: Programming Projects

1. (a) Write a program that reads a message, then prints the reversal of the message:

```
Enter a message: Don't get mad, get even.
Reversal is: .neve teg ,dam teg t'noD
```

Hint: Read the message one character at a time (using `getchar`) and store the characters in an array. Stop reading when the array is full or the character read is `'\n'`.

(b) Revise the program to use a pointer instead of an integer to keep track of the current position in the array.

3. Simplify Programming Project 1(b) by taking advantage of the fact that an array name can be used as a pointer.

4. Simplify Programming Project 2(b) by taking advantage of the fact that an array name can be used as a pointer.