York University
Electrical Engineering and Computer Science

EECS2031: Software Tools
SU2016
Assignment #5

Chapter 11: Exercises

1. If `i` is a variable and `p` points to `i`, which of the following expressions are aliases for `i`?

   (a) `*p` (c) `*&p` (e) `*i` (g) `*&i`
   (b) `&p` (d) `&*p` (f) `&i` (h) `&*i`

2. If `i` is an `int` variable and `p` and `q` are pointers to `int`, which of the following assignments are legal?

   (a) `p = i;` (d) `p = &q;` (g) `p = *q;`
   (b) `*p = &i;` (e) `p = *&q;` (h) `*p = q;`
   (c) `&p = q;` (f) `p = q;` (i) `*p = *q;`

3. The following function supposedly computes the sum and average of the numbers in the array `a`, which has length `n`. `avg` and `sum` point to variables that the function should modify. Unfortunately, the function contains several errors; find and correct them.

```
void avg_sum(double a[], int n, double *avg, double *sum)
{
  int i;

  sum = 0.0;
  for (i = 0; i < n; i++)
    sum += a[i];
  avg = sum / n;
}
```

4. Write the following function:

```
void swap(int *p, int *q);
```

When passed the addresses of two variables, `swap` should exchange the values of the variables:

```
swap(&i, &j);    /* exchanges values of i and j */
```

7. Write the following function:

```
void split_date(int day_of_year, int year,
                int *month, int *day);
```

`day_of_year` is an integer between 1 and 366, specifying a particular day within the year designated by `year`. `month` and `day` point to variables in which the function will store the equivalent month (1–12) and day within that month (1–31).

7. Write the following function:

```
void split_date(int day_of_year, int year,
                int *month, int *day);
```

`day_of_year` is an integer between 1 and 366, specifying a particular day within the year designated by `year`. `month` and `day` point to variables in which the function will store the equivalent month (1–12) and day within that month (1–31).

8. Write the following function:

```
int *find_largest(int a[], int n);
```

When passed an array `a` of length `n`, the function will return a pointer to the array's largest element.

Chapter 11: Programming Projects

2. Modify Programming Project 8 from Chapter 5 so that it includes the following function:

```
void find_closest_flight(int desired_time,
                         int *departure_time,
                         int *arrival_time);
```

This function will find the flight whose departure time is closest to `desired_time` (expressed in minutes since midnight). It will store the departure and arrival times of this flight (also expressed in minutes since midnight) in the variables pointed to by `departure_time` and `arrival_time`, respectively.

3. Modify Programming Project 3 from Chapter 6 so that it includes the following function:

```
void reduce(int numerator, int denominator,
            int *reduced_numerator,
            int *reduced_denominator);
```

`numerator` and `denominator` are the numerator and denominator of a fraction. `reduced_numerator` and `reduced_denominator` are pointers to variables in which the function will store the numerator and denominator of the fraction once it has been reduced to lowest terms.