

## CS3035 Programming Language Paradigms

### Lab 03-1: Subprograms (September 8)

#### Solution

Total Points: 15

Q1: [10 POINTS]

Consider the following program written in C syntax:

```
void swap(int a, int b) {  
    int temp;  
    temp = a;  
    a = b;  
    b = temp;  
}  
  
void main() {  
    int value = 2, list[5] = {1, 3, 5, 7, 9};  
    swap(value, list[0]);  
    swap(list[0], list[1]);  
    swap(value, list[value]);  
}
```

For each of the following parameter-passing methods, what are all of the values of the variables `value` and `list` after each of the three calls to `swap`?

- Passed by value
- Passed by reference
- Passed by value-result

#### Answer:

(a) pass-by-value:

after `swap(value, list[0])`: `value = 2`, `list={1,3,5,7,9}`

after `swap(list[0], list[1])`: `value = 2`, `list={1,3,5,7,9}`

after `swap(value, list[value])`: `value = 2`, `list={1,3,5,7,9}`

(b) pass-by-reference:

after swap(value, list[0]): value = 1, list={2,3,5,7,9}

after swap(list[0], list[1]): value = 1, list={3,2,5,7,9}

after swap(value, list[value]): value = 2, list={3,1,5,7,9}

(c) pass-by-value-result:

after swap(value, list[0]): value = 1, list={2,3,5,7,9}

after swap(list[0], list[1]): value = 1, list={3,2,5,7,9}

after swap(value, list[value]): value = 2, list={3,1,5,7,9}

Q2: [5 POINTS]

Consider the following program written in C syntax:

```
void fun (int first, int second) {  
    first += first;  
    second += second;  
}  
void main() {  
    int list[2] = {1, 3};  
    fun(list[0], list[1]);  
}
```

For each of the following parameter-passing methods, what are the values of the `list` array after execution?

- Passed by value
- Passed by reference
- Passed by value-result

**Answer:**

(a) 1, 3

(b) 2, 6

(c) 2, 6