# CS100 Introduction to Programming Quiz 1 (A)

October 18, 2019

Student Name（学生名字）:_____ Matriculation Number（学号）:_____

Tutor Group Time（助教小组时间）:_____ Tutor Name（助教姓名）: _____

This **close-book quiz** comprises 4 questions, each of which has 0.5 mark. For each question, choose **one option** that answers the question and write your choice in the following table.

**Total marks: 2**

| Question | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Your Answer | B | A | D | C |

1. Given the code snippet below, what is the output result?

```
union A{
    struct{
        float x1;
        float x2;
    };
    float y;
};

int main(){
    union A a;
    a.x1 = 10.0f;
    a.x2 = 15.3f;
    a.y = 9.5f;

    printf("the component x1 of A "
           "is: %f\n", a.x1);
    return 0;
}
```

(A) the component x1 of A is: 15.300000
(B) the component x1 of A is: 9.500000
(C) the component x1 of A is: 10.500000
(D) the component x1 of A is: 10.000000

2. Given the following implementation with recursive function call, choose the final output result.

```
int data[10];

void change_data(int base_value, int* data,
int start, int end){
    if (end <= start)
        return;
    else
        base_value++;

    change_data(base_value, data, start,
                end - 1);

    int i = 0;
    for (i = start; i <= end; i++)
        data[i] = base_value + (i - start);
}

int main(){
    int i;
    memset(data, 0, sizeof(int) * 10);

    change_data(0, data, 0, 9);

    printf("the array is:\n");
    for (i = 0; i < 10; i++)
        printf("%d ", data[i]);

    return 0;
}
```

(A) 1 2 3 4 5 6 7 8 9 10 (B) 0 1 2 3 4 5 6 7 8 9
(C) 0 0 0 0 0 0 0 0 0 0 (D) 2 4 6 8 10 12 14 16 18 20

3. Given two implementations below, what are their outputs respectively?

Implementation 1:

```
struct A{
    int data[9];
    int index;
};

void change_data(struct A a){
    a.data[a.index] = -3;
}

int main(){
    int i;
    A a;
    a.index = 5;
    for (i = 0; i < 9; i++)
        a.data[i] = i+1;
    change_data(a);

    printf("the array is:\n");
    for (i = 0; i < 9; i++)
        printf("%d ", a.data[i]);

    return 0;
}
```

Implementation 2:

```
int data[9];

struct A{
    int* p_data;
    int index;
};

void change_data(struct A a){
    a.p_data[a.index] = -3;
}

int main(){
    int i;
    A a;
    for (i = 0; i < 9; i++)
        data[i] = i+1;
    a.p_data = data;
    a.index = 5;
    change_data(a);

    printf("the array is:\n");
    for (i = 0; i < 9; i++)
        printf("%d ", a.p_data[i]);

    return 0;
}
```

(A) 1 2 3 4 5 -3 7 8 9; 1 2 3 4 5 -3 7 8 9
(B) 1 2 3 4 5 -3 7 8 9; 1 2 3 4 5 6 7 8 9
(C) 1 2 3 4 5 6 7 8 9; 1 2 3 4 5 6 7 8 9
(D) 1 2 3 4 5 6 7 8 9; 1 2 3 4 5 -3 7 8 9

4. The following code snippets has several problems, which will lead to compile or run-time errors. Select **all** snippets that has such errors.

```
class Base{
public:
    Base(int num = 0);
    ~Base();
protected:
    int *data;
    int num;
};
```

①

```
class Child : public Base{
public:
    Child(int num);
    ~Child();
};
```

②

```
//implementation of Base class
Base::Base(int num){
    if (num <= 0) return;
    data = new int[num];
    this->num = num;
}

Base::~Base(){
    delete[]data;
}
```

③

```
//implementation of Child class
Child::Child(int num){
    Base::Base(num);
    if (num <= 0) return;
    data = new int[num];
    this->num = num;
}
```

④

```
Child::~Child(){
    delete[]data;
}
```

⑤

```
int main(){
    Child a(10);
    return 0;
}
```

(A) ③ (B) ③⑤ (C) ④⑤ (D) ④