

Dynamic Memory Allocation & References

Exercises

CS185

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1. The program below compiles cleanly and may even run correctly, yet there are two serious flaws with it. Describe each flaw in one or two short sentences.

Code	<pre>void print_array(void) { int *p = new int [10]; for (int i = 0; i < 10; ++i) { p[i] = i; std::cout << p[i] << std::endl; } }</pre>
Answer	

2. The program below compiles cleanly and may even run correctly, yet there is a serious flaw with it. Describe the flaw in one or two short sentences.

Code	<pre>int * numbers = new int [10]; for (int i = 0; i < 10; ++i) { numbers[i] = i; } delete numbers;</pre>
Answer	

3. Given the below Point structure:

```
struct Point
{
    float x, y;
};
```

Write the C++ code that will dynamically allocate an array of 15 points:

Answer

4. Given the three declarations below, indicate whether or not the remaining declarations below them are valid. If the declaration compiles, write **C**, if it doesn't compile, write **NC**.

```
const int cx = 10;
float f = 2.0F;
int x = 5;
```

- a) _____ int &r1 = 5;
- b) _____ int &r2 = x;
- c) _____ int &r3 = &x;
- d) _____ int &r4 = cx;
- e) _____ int &r5 = r2;
- f) _____ int &r6 = f;
- g) _____ int &r7 = (int)f;
- h) _____ const int &r8 = x;

5. What does the following code print out? Write **NC** if the code doesn't compile.

Code

```
int& find_min(int a[], int size)
{
    int i; int min = 0;
    for (i = 1; i < size; ++i)
    {
        if (a[i] < a[min])
        {
            min = i;
        }
    }

    return a[min];
}

int main(void)
{
    int a[] = { 4, 5, 3, 9, 5, 2, 7, 6 };
    int size = sizeof(a) / sizeof(*a);

    find_min(a, size) = 0;

    for (int i = 0; i < size; ++i)
    {
        std::cout << a[i] << " ";
    }

    return 0;
}
```

Answer

6. When should you pass data as constant reference as opposed to passing the data as reference?

Answer

7. Is it safe to use the MakePoint function? if not, why?

Code

```
struct Point
{
    float x, y;
};

Point& MakePoint(void)
{
    Point p = { 0.0f, 0.0f };
    return p;
}
```

Answer