

# Practice final exam solutions

17 December 2014

You can assume that every program here begins with the usual `#include` and namespace declarations.

**1. Describe any errors you find in the following code fragment.**

```
string message = 'Nice job.';
Cout << message.at(10) << endl;
```

**2. The following program contains two void functions. What does it output?**

```
void cron();
void yen();

int main()
{
    yen(); cron();
    cout << endl;
    cron(); yen();
    cout << endl;
    return 0;
}

void cron()
{
    cout << "X";
    yen();
    cout << "Z";
}

void yen()
{
    cout << "Y";
}
```

Output:

```
YXYZ
XYZY
```

3. The following program uses nested function calls with return values. What is its output?

```
int zig(int x)
{
    if(x > 5) {
        return x - 2;
    }
    else {
        return x + 3;
    }
}

int zag(int y)
{
    return y*2;
}

int main()
{
    cout << zig(3) << endl;
    cout << zag(4) << endl;
    cout << zig(zag(5)) << endl;
    cout << zag(zig(zag(6))) << endl;
    return 0;
}
```

Output:

```
6
8
8
20
```

**4. The following program uses a vector. What does it output?**

```
int main()
{
    const int SZ = 5;
    vector<int> g(SZ);
    int x = 5;
    for(int i = 0; i < SZ; i++)
    {
        x += i;
        g.at(i) = x;
    }
    for(int i = SZ-1; i >= 0; i--)
    {
        cout << g.at(i) << "\n";
    }
    return 0;
}
```

Output:

```
15
11
8
6
5
```

5. The following program contains a function with a vector parameter. What does it output?

```
float stomp(vector<float> nums)
{
    float borg = nums.at(0);
    for(int i = 1; i < nums.size(); i += 2)
    {
        if(nums.at(i) > borg)
        {
            borg = nums.at(i);
        }
    }
    return borg;
}
```

```
int main()
{
    vector<float> moo(5);
    moo.at(0) = 3.4;
    moo.at(1) = 2.5;
    moo.at(2) = 9.1;
    moo.at(3) = 8.2;
    cout << stomp(moo) << endl;

    vector<float> zoo;
    zoo.push_back(8.4);
    zoo.push_back(2.6);
    zoo.push_back(3.5);
    zoo.push_back(7.1);
    cout << stomp(zoo) << endl;
    return 0;
}
```

Output:

8.2  
8.4

6. The following program manipulates an array of characters. What does it output?

```
int main()
{
    const int MAX = 40;
    char mesg[MAX] = "Thor";
    cout << mesg << "\n";
    mesg[6] = '\0';
    mesg[5] = 'n';
    mesg[4] = 'i';
    cout << mesg << "\n";
    return 0;
}
```

Output:

Thor  
Thorin

7. The following program manipulates a string. What does it output?

```
int main()
{
    string name = "Ada Lovelace";
    for(int i = 1; i < name.size(); i++)
    {
        switch(name[i])
        {
            case 'a': case 'A':
            case 'e': case 'E':
            case 'i': case 'I':
                name.at(i) = 'o';
        }
    }
    cout << name << "\n";
    return 0;
}
```

Output:

Ado Lovoloco