

Midterm Exam solutions

27 October 2014

1. The following program just uses variables. What does the program output?

```
#include <iostream>
using namespace std;
int main()
{
    int alfred = 9;
    double batman = alfred / 2;
    alfred = alfred + 1;
    int chloe = alfred - 6;
    chloe = chloe * 3;
    cout << alfred << ", " << batman << ", " << chloe << "\n";
    return 0;
}
```

Output:

10, 4, 12

2. The following program uses ASCII character arithmetic. What does the program output?

```
#include <iostream>
using namespace std;
int main()
{
    char a = 'e';
    char b = 'l';
    char c = a + 3;
    char d = b + 3;
    cout << c << a << b << b << d << endl;
    return 0;
}
```

Output:

hello

3. The following program uses conditions. What does the program output?

```
#include <iostream>
using namespace std;
int main()
{
    int elrond = 8;
    int arwen = 4;
    if(elrond % 2 == 0)
    {
        arwen *= 2;
        elrond += 1;
    }
    else
    {
        elrond = elrond - 1;
        arwen *= 4;
    }
    cout << elrond << ", " << arwen << "\n";
    return 0;
}
```

Output:

9, 8

4. Given maxPrice = 9.99, itemCount = 15, response = 'q', mark each of these expressions as true or false.

- a. true maxPrice >= 10
- b. false (maxPrice >= 10) && (itemCount > 13)
- c. true (maxPrice >= 20) || (itemCount >= 15)
- d. false !(itemCount < 5)
- e. true !(response == 'a')
- f. true response != 'a'
- g. true !((maxPrice >= 9) && (itemCount > 9))
- h. true (response == 'x') || ((maxPrice > 5) && (itemCount > 1))

5. The following program uses string modification operations. What does the program output?

```
#include <iostream>
using namespace std;
int main()
{
    string item = "New Amsterdam";
    cout << item << endl;
    item.push_back('k');
    cout << item << endl;
    item.replace(4, 9, "Yor");
    cout << item << endl;
    item.insert(4, "New ");
    cout << item << endl;
    return 0;
}
```

Output:

```
New Amsterdam
New Amsterdamk
New York
New New York
```

6. The following program uses a switch. What does the program output?

```
#include <iostream>
using namespace std;
int main()
{
    int threatLevel = 3;
    threatLevel += 1;
    switch(threatLevel)
    {
        case 3: cout << "arnold ";
        case 2: cout << "brad "; break;
        case 5: cout << "chloe "; break;
        case 4: cout << "diane ";
        default: cout << "emily ";
    }
    cout << "smith\n";
    return 0;
}
```

Output:

diane emily smith

7. The following program uses *nested if/else* statements. Given the values of `baz` and `tar` as inputs, what does the program output?

- `baz = 6; tar = 3`; Output: Lager Neue
- `baz = 3; tar = 8`; Output: Guinness Heineken IPA Neue
- `baz = 6; tar = 9`; Output: Lager Barley Neue
- `baz = 4; tar = 9`; Output: Heineken IPA Neue
- `baz = 3; tar = 4`; Output: Guinness IPA Neue

```
#include <iostream>
using namespace std;
int main()
{
    int baz, tar;
    cin >> baz >> tar; // Receives values as shown above
    if(baz <= 4)
    {
        if(baz < 4)
        {
            cout << "Guinness ";
        }
        if(tar >= 8)
        {
            cout << "Heineken ";
        }
        cout << "IPA ";
    }
    else
    {
        cout << "Lager ";
        if(tar >= 6)
        {
            cout << "Barley ";
        }
    }
    cout << "Neue\n";
    return 0;
}
```