Midterm Exam solutions

31 October 2016

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 iostream fill and field width specifications. What does the program output?

```
#include <iostream>
#include <iomanip>
using namespace std;
int main()
{
    int amount = 51;
    cout.fill('$');
    cout << setw(5) << amount << endl;
    string username = "hsimpson";
    cout.fill('!');
    cout << setw(10) << username << endl;
    return 0;
}
```

Output:

```
$$$51
!!hsimpson
```

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;
}
```