EECS 183 Fall 2014 Exam 2

Closed Book Minimal Notes Closed Electronic Devices Closed Neighbor

Turn off Your Cell Phones
We will confiscate all electronic devices that we see – including cell phones, calculators, etc.

Multiple Choice Questions
(20 questions * 6 points per question = 120 points)

Key 1

Instructions: Read Carefully!

1. You may have one 3" x 5" handwritten notecard.
2. Some questions are not simple. Therefore, read carefully.
3. Assume all code and code fragments are syntactically valid, unless otherwise specified.
4. Assume/use only the standard C++11 / Python 2.7.
5. **In all the given code, if any character looks like a space, it is one.**

6. On the scantron sheet, bubble in your **name** and **UMID -- 10 pts off for incorrect UMID**.
7. On the scantron sheet, bubble in **Key 1 -- zero on exam if key not bubbled in**.
8. Sign below and print your uniqname -- **10 pts off if we cannot read your uniqname**

"I have neither given nor received aid on this examination, nor have I concealed any violations of the Honor Code."

Signature uniqname

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C++

1. Which is an **invalid** function declaration, given the following code?

```
const int WIDTH = 5;
const int HEIGHT = 3;
```

A. `void foo(int arr[HEIGHT][WIDTH]);`

B. `void foo(int arr[][WIDTH]);`

C. `void foo(int arr[][]);`

D. `void foo(int arr[5][3]);`

E. `void foo(int arr[][3]);`

2. Suppose we have the following code:

```
int arr[5][3] = {{1,2,3},{4,5,6},{7,8,9},{10,11,12},{13,14,15}};
for (int i = 0; i < 3; i++) {
   for (int j = 0; j < 3; j++) {
       cout << arr[i][j] << ' ';
   }
   cout << endl;
}
```

What will print as a result of running the above code?

A.
```
1 2 3
4 5 6
7 8 9
```

B.
```
1 4 7
2 5 8
3 6 9
```

C.
```
1 2 3
4 5 6
7 8 9
10 11 12
13 14 15
```

D.
```
1 2 3 4 5
6 7 8 9 10
11 12 13 14 15
```

E.
```
1 4 7 10 13
2 5 8 11 14
4 6 9 12 15
```

3. Given the following code:

```
const int SIZE = 5;
char a[SIZE][SIZE];
for (int i = 0; i < SIZE; i++) {
   a[i][i+1] = i;
}
```

What is the first location accessed by this code that goes out of bounds of the array?

A. `a[-1][0]`

B. `a[0][-1]`

C. `a[4][5]`

D. `a[5][6]`

E. The code never goes out of bounds of the array.

4. The `swap` function below contains a bug. If `a` and `b` are declared integers in `main`, which assigned values would activate the bug in the code when `swap(a,b)` is called?

```
void swap (int &x, int &y) {
    int temp = (x / y) * y + (x % y);
    x = (y / x) * x + (y % x);
    y = temp;
}
```

A. `a = 1; b = 1;`

B. `a = 0; b = 1;`

C. `a = 1; b = 2;`

D. `a = 2; b = 1;`

E. `a = 1; b = -1;`

C++

For questions 4 and 5, consider the following code.

Steve has written a new cipher function in C++, which he calls “sillyCipher”. It is implemented in the following function:

```
void sillyCipher(const string &original, string &result) {
   for (int x = 0; x < original.length(); x++) {
       if (original[x] >= 'A' && original[x] <= 'M') {
           result[x] = 'A';
       }
       else if (original[x] >= 'N' && original[x] <= 'Z') {
           result[x] = 'B';
       }
   }
}
```

5. Suppose `sillyCipher` is called and a string containing `"LISA"` is passed as the first parameter. What would be stored in `result` by the end of `sillyCipher`’s execution (assuming `result` is also of length 4)?

   A. `"AABA"`

   B. `"ABAA"`

   C. `"ABAB"`

   D. `"BBAB"`

   E. `"BABA"`

6. Which of the following sentences best describes the behavior of `sillyCipher`?

   A. It is a clever and useful cipher, since it was written by Steve.

   B. It is not a useful cipher because its result cannot be decoded.

   C. It will not compile because one cannot index into strings like arrays.

   D. It will not work correctly because it has an off-by-one error.

   E. It will not work correctly because one of the strings is designated `const`.

I/O

7. Which of the following is not a valid stream state?

   A. good

   B. bad

   C. fail

   D. eof

   E. clear

8. Which line of the following code contains a bug?

```
 1     #include <iostream>
 2     #include <fstream>
 3     #include <string>
 4     using namespace std;
 5
 6     int main() {
 7         ifstream inFile;
 8         ifstream.open("myFile.txt");
 9         if (!inFile) {
10             cout << "Could not open file." << endl;
11             return 1;
12         }
13         string line;
14         getline(inFile, line);
15         cout << line << endl;
16         inFile.close();
17         return 0;
18     }
```

   A. line 7

   B. line 8

   C. line 9

   D. line 14

   E. line 15

Classes

The following code will be used for Questions 9, 10, and 11.

Given the following definition of a class named `Square`.

```
class Square {
public:
   void setLength(int newLength) {
       length = newLength;
       areaValue = length * length;
   }

   int area() const {
       return areaValue;
   }

private:
   int length;
   int areaValue;

};
```

9. The `area` member function is an example of a:

   A. constructor

   B. destructor

   C. getter

   D. setter

   E. void function

10. What does `const` after `int area()` mean?

    A. `area()` returns a constant value.

    B. `area()` does not modify the value of `areaValue`.

    C. `area()` does not modify any member variables’ values.

    D. The programmer cannot modify the implementation of `area()`.

    E. No other functions named `area()` can exist.

C++

11. Which of the following implementations of a constructor for `Square` would be correct and consistent with other member functions **if implemented within the class along with setLength and area**?

A.
```
Square() {
    length = 1;
}
```

B.
```
Square() {
    length = 1;
    area = 1;
}
```

C.
```
Square() {
    setLength(1);
}
```

D.
```
void Square() {
    length = 1;
}
```

E.
```
void Square() {
    length = 1;
    areaValue = 1;
}
```

12. In C++ classes, by default, member variables are _________ and member functions are _____________

A. public, public

B. public, private

C. private, public

D. private, private

E. C++ class members have undefined default behavior.

Python

13. Python is a(n):

    A. C++ library

    B. compiler

    C. integrated developer environment (IDE)

    D. programming language

    E. web browser

14. An array in C++ is best compared to which data structure in Python?

    A. class

    B. dictionary

    C. float

    D. list

    E. range

15. What does the following code print?

```
fibonacci = [1, 1, 2, 3, 5, 8, 13, 21]
print fibonacci[1:3]
```

    A. `[1, 1, 2, 3]`

    B. `[1, 2, 3]`

    C. `[1, 2]`

    D. `[1, 1, 2]`

    E. `[1, 2, 3, 5, 8, 13, 21]`

Python

16. What prints after the execution of the following Python code if the user inputs `0<ENTER>`?

```
x = int(raw_input())
if x == 0:
    print 'x is 0'
elif x == 1:
    print 'x is 1'
    print 'x is an integer'
```

A. `x is 0`

B. `x is 0`
`x is an integer`

C. `x is 1`
`x is an integer`

D. `x is an integer`

E. Nothing prints.

17. What does the following code print?

```
lst = []
nums = [15, 6]
lst.append(nums)
nums = [10, 30, 20]
lst.append(nums)
lst.sort()
print lst
```

A. `[6, 10, 15, 20, 30]`

B. `[[6, 15], [10, 20, 30]]`

C. `[[15, 6], [10, 30, 20]]`

D. `[[10, 30, 20], [15, 6]]`

E. `[[10, 20, 30], [6, 15]]`

Python

18. What does the following print?

```
import sys

def foo(n):
    for i in range(0, n):
        print " " * i,
        print "*" * (n - i)

def main(argv):
   foo(3)

if __name__ == '__main__':
    main(sys.argv)
```

A.
```
*
**
***
```

B.
```
***
**
*
```

C.
```
***
 **
  *
```

D.
```
******
```

E.
```
***

**

*
```

19. Which of the following is NOT a valid operation on a string variable in Python?

A. Addition of strings, which is equivalent to appending strings:
`print 'Hello '  + ' World!'`

B. Addition of strings and integers, which is equivalent to appending integers to strings:
`course = 'EECS ' + 183`

C. Multiplication of string and integers, which repeats the string the integer number of times:
`'$' * 5`

D. Indexing into a string to get a single letter of the string:
```
name = 'Maxim'
c = name[0]
```

E. Assignment of an integer to a variable currently holding a string:
```
course = 'EECS 183'
course = 183
```

20. What does the following code output?

```
s = 'ABC'
n = 1
for c in s:
    print c * n,
    n += 1
```

A.
```
A
B
C
```

B. `A B C`

C.
```
A
BB
CCC
```

D. `A BB CCC`

E. `1 4 9`