**Solution for Homework 2**

**ECE 309 Fall 2019**

**Due: September 11, 2019**

Upload an electronic copy of your answers to Moodle under HW2.

These problems are worth 85 points total, but the grade will be reported as a percentage in Moodle.

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# **1. Work the following ZyLabs for review of C and some new C++ concepts**

* [10 points] ZyLab 5.20
* [10 points] ZyLab 6.18
* [10 points] ZyLab 6.19
* [10 points] ZyLab 7.20
* [10 points] ZyLab 7.27

# **2. Interpret the execution of C++ objects**

Consider the following C++ code:

#include <stdio.h>

class A {

private:

class B {

public:

void print(char c=’B’) { printf(“%c”,c); }

~B() { print(‘h’); }

};

B x;

public:

A() { x.print(); }

void p(int a=1) { printf(“%x”,a); }

void p(char c, int n=5) { for(int i=0; i<n; i++) x.print(c); }

};

int main()

{

A a;

a.p(10);

a.p(‘a’);

return 0;

}

a. [5 points] What’s the output of this code?

Ans.

Baaaaaah pts- 1, 1, 2, 1

b. [10 points] For each part of the output, identify which member function of which object printed it. If multiple objects were involved, please identify them all and their member functions.

Ans. A a; 🡪 x.print() 🡪 default value ‘B’ pts- 2, 2, 4, 2

a.p(10) 🡪 void p (int a=1) …. 🡪 hex of 10 ‘a’

a.p(‘a’) 🡪 void p (char ….) 🡪 default 5 times print of x with char ‘a’ 🡪 aaaaa

destructor of B on exiting main for x created during A a 🡪 ‘h’

# **3. Construction and destruction of objects**

[20 points] For the following program, identify all of the objects that are constructed and destructed. Also, identify where in the code the destruction happens. You may ignore copy constructed objects for this problem.

class A {

int x;

public:

A(int a\_x=0) {x = a\_x;}

};

class B {

A a;

public:

B(A a\_a=0) {a = a\_a;}

~B() {}

};

B globalb(A(5));

int main() {

A localA = 1;

B localB;

B \* heap\_b = new B;

A \* heap\_a;

return 0;  
}

Ans

Pts break-up: 4, 2, 5, 3, 2, 2, 2

B globalb(A(5)); 🡪 globalb created with -> A(5) created with value 5; Then object ‘a’ of type A inside B’s constructor created with default value 0. A(5) destroyed after globalB is constructed.

int main() {

A localA = 1; 🡪 LocalA created with value 1.

B localB; 🡪 LocalB created 🡪 which means a\_a created with default value 0 and a created with default value of 0.

B \* heap\_b = new B; 🡪 pointer heap\_b is created for object type B explicitly; which means a\_a created with default value 0 and a created with the default value of 0.

A \* heap\_a; 🡪 pointer heap\_a created, no object created as no “new” key word used.

return 0;

}

🡪 destructor for localA called here before main

returns.

🡪 destructor LocalB called here before main

returns. This includes destruction of its localB.a.

* Destructor for globalb called when program memory is cleaned up much later. This includes destruction of its globalB.a