Name: _____

Student #:_____

Mark: _____/200

University of Idaho

Sample Midterm. Your midterm will have some subset of this course coverage. It might also include some general knowledge questions you would know if you attended class

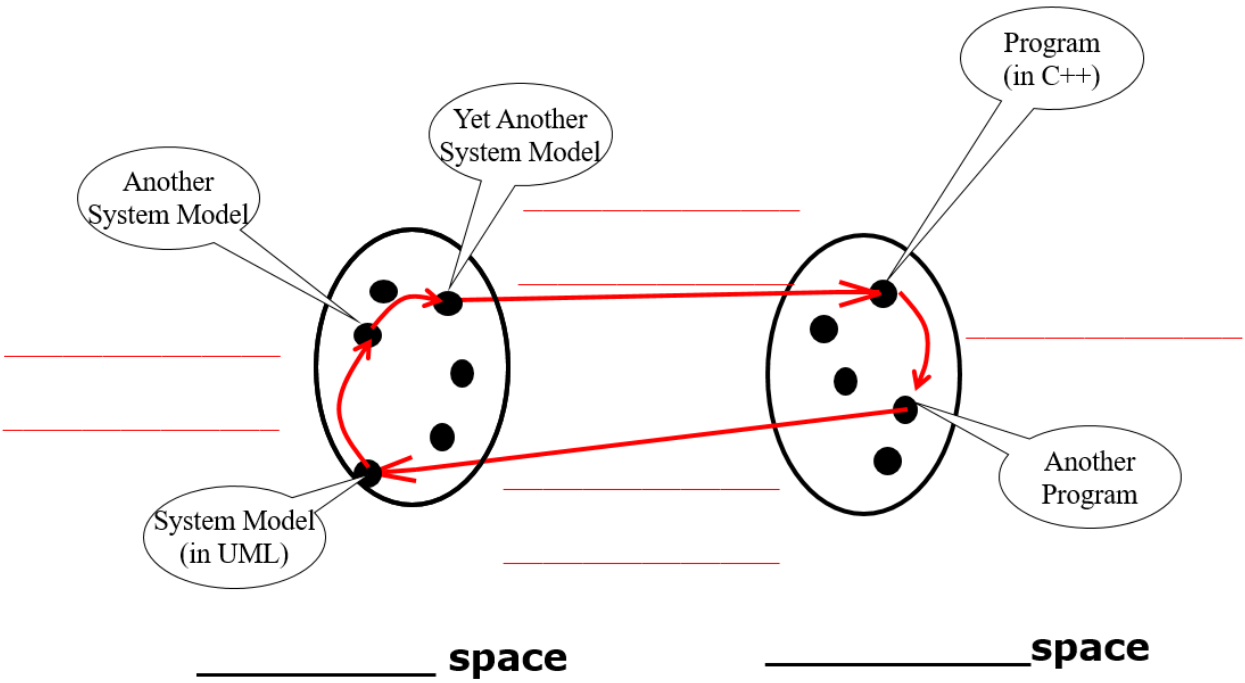
This is a closed book test.

No electronic device (including calculators or smart watches) permitted.

Please ensure you have all pages before you begin.

Write your answers on the question paper in the spaces provided. Use the reverse side and the last page for rough work. The total time allowed is 80 minutes.

Question 1: Fill in the blanks on this diagram below. What are the words associated with the activities related to mapping models to code?



/18

Question 2: Draw the class diagram for the Singleton Pattern. (Note: Might be something else we have gotten to in class if we have not seen patterns yet.)

/6

Question 4: Consider this code and fill in the output (on the blank lines) in the main function on the following page:

```
#include <iostream>
using namespace std;

class Grandpa
{
   public:
     virtual void DoDynamic() {cout << "      Dynamic Grandpa" << endl;}
     void DoStatic(){cout << "      Static Grandpa" << endl;}
     void DoPartial() {cout << "      Partial Grandpa" << endl;}

};

class Father: public Grandpa
{
   public:
     void DoDynamic(){ cout << "      Dynamic Father" << endl; }
     void DoStatic(){cout << "      Static Father" << endl;}
     virtual void DoPartial() {cout << "      Partial Father" << endl;}
};

class Son: public Father
{
   public:
     void DoDynamic(){ cout << "      Dynamic Son" << endl; }
     void DoStatic(){cout << "      Static Son" << endl;}
     void DoPartial() {cout << "      Partial Son" << endl;}
};
```

```
int main()                    // On each blank line write the output produced by that line
{

   // As static Grandpa dynamic Grandpa

   Grandpa * pGrandpa1 = new Grandpa();

   pGrandpa1->DoDynamic();                ____________________________________________

   pGrandpa1->DoStatic();                 ____________________________________________

   pGrandpa1->DoPartial();                ____________________________________________

   // As static Grandpa dynamic Father

   Grandpa * pGrandpa2 = new Father();

   pGrandpa2->DoDynamic();                ____________________________________________

   pGrandpa2->DoStatic();                 ____________________________________________

   pGrandpa2->DoPartial();                ____________________________________________

   // As static Grandpa dynamic Son

   Grandpa * pGrandpa3 = new Son();

   pGrandpa3->DoDynamic();                ____________________________________________

   pGrandpa3->DoStatic();                 ____________________________________________

   pGrandpa3->DoPartial();                ____________________________________________

   // As static Father dynamic Father

   Father * pFather1 = new Father();

   pFather1->DoDynamic();                 ____________________________________________

   pFather1->DoStatic();                  ____________________________________________

   pFather1->DoPartial();                 ____________________________________________

   // As static Father dynamic Son

   Father * pFather2 = new Son();

   pFather2->DoDynamic();                 ____________________________________________

   pFather2->DoStatic();                  ____________________________________________

   pFather2->DoPartial();                 ____________________________________________

}
```

/15

Question 5: Draw the PERT Diagram for this activity table. Show the critical path.

Task	Duration	Predecessor
A	**1**	**START**
B	**1**	**A**
C	**5**	**A**
D	**2**	**B**
E	**1**	**C, D**
F	**1**	**E**
G	**1**	**F**

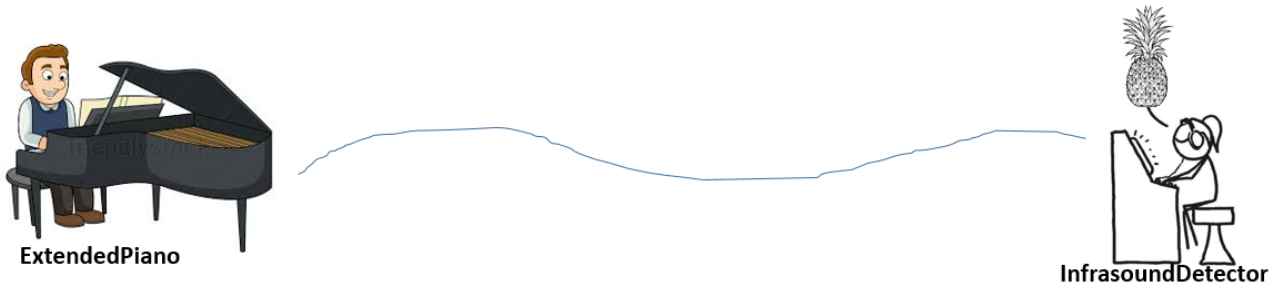
/35

Question 6: Draw the Gantt chart for the PERT diagram on the previous page. (Show slack time and predecessors).

/20

Question 7: Use this narrative to answer the questions on the following pages (You can detach this page for convenience if you want) **Subsonic-Pizza** is the system, and it contains the classes **ExtendedPiano**, **PizzaSoundDB**, **PayFriend** and **InfrasoundDetector**.

Inspired my Randall Munro's book How To, **Subsonic-Pizza** in Roswell, New Mexico has developed a revolutionary way to order pizza using an **ExtendedPiano** capable of creating sounds below 15 MHz that are undetectable to the human ear, but are exactly the right frequencies to be detected by the **InfrasoundDetector**s already present.



David is ordering Pizza from his favorite pizza place, **Subsonic-Pizza**. He uses the **ExtendedPiano** to play the notes that will cause the **InfrasoundDetector** at **Subsonic-Pizza** to display pictures of his favorite toppings: pineapple, mushrooms and meatballs. He does not know the correct sequence for stuffed crust so he access the **PizzaSoundDB** which returns the sheet music for stuffed crust. David cannot read sheet music, so the system highlights on the **ExtendedPiano** the notes he needs to play in the proper order.

David pays for the delivery using **PayFriend** which asks David for his pass code. After getting the passcode wrong it gives him the hint that the passcode is his favorite alien. After getting it wrong two more times **PayFriend** has him enter his credit card manually.

Use this narrative to answer the questions on the following pages.

7 A. Draw a sequence diagram for the narrative.

/30

7B. Draw a Use Case Diagram from the narrative. (State any assumptions)

/30

7C. Write the scenario for the use case diagram on the previous page

/30

7D. Draw the Context Level Data Flow Diagram from the narrative

/10

7E. Draw the Diagram 0 from the narrative (Assume each of the classes mentioned is a subsystem.

/30

7F. Write a Process Description for paying for the pizza based on the narrative. (On a real test I will specify if I want a Decision Tree, Structured English or a Decision Table.)

/30

Note: If we have to gotten to GRASP yet, this will not be on the mid-term.

Question 1: What are the 7 levels of cohesion in order from best to worst:

7._____

7._____

5._____ /7

4._____

3._____

2._____

1._____

Question 2: Give of an example of either good cohesion or bad cohesion from your code.

/3

Question 3: What level of cohesion is it? Why?

This page is intentionally blank. You may detach it (carefully) use it as scrap paper.