Honor Pledge

On my honor, I have neither given nor received any unauthorized aid on this quiz.

By typing your first and last name in the space provided below you are electronically signing to indicate that:

(1) You are the person who is taking this quiz.

(2) You read and understood the Honor Pledge and you agree to be bound by it.

Question 1. (8 pts) Consider the following code:

```
class Q1 {
  public static void main(String[] args) {
    Grad g = new Grad("Alice");
    Undergrad u = new Undergrad("Bob");
    Student[] reg = { g, u };
    for (Student stud : reg) {
      System.out.println(stud.getInfo());
    }
    System.out.println(g.getInfo(false));
  }
}

abstract class Student {
  public String getInfo() {
    return "N/A";
  }
}

class Undergrad extends Student {
  public Undergrad(String aName) {
    this.name = aName;
  }
  public String getInfo() {
    return this.name + " is an undergraduate student";
  }
  private String name;
}

class Grad extends Student {
  public Grad(String aName) {
    this.name = aName;
  }
  public String getInfo() {
    return this.name + " is a graduate student";
  }
  public String getInfo(boolean detailed) {
    if (detailed)
      return this.getInfo();
    else
      return this.name;
  }
  private String name;
}
```

Which features does this code demonstrate? Mark all that apply.

Question 2. (12 pts) Consider the following set of pre and postconditions for a method:

```
//   Precondition: "aChar" is a character from the set
//   of characters defined by the following ranges:
//   'A' ... 'Z', 'a' ... 'z', '0'...'9'
//
//   Postcondition: The value returned by the function
//   is true if "aChar" is a valid octal digit;
//   otherwise the value returned by the function is false.
boolean isOctDigit(char aChar) {
  ...
}
```

What is the result of the following call:

```
isOctDigit('-');
```

Question 3. (8 pts) For any Hoare triple which is false (invalid) we can always find a weaker precondition that would make this Hoare triple true (valid).

Question 4. (12 pts) Find the weakest precondition for the following code. Show all intermediate conditions. Simplify your answer as much as possible.

```
{ _____________ } // This is the weakest precondition. Please fill in.
x++;
{ _____________ } // This is an intermediate condition. Please fill in.
if (z != 5) {
  { _____________ } // This is an intermediate condition. Please fill in.
  z = x + 1;
  { _____________ } // This is an intermediate condition. Please fill in.
  y = z;
  { _____________ } // This is an intermediate condition. Please fill in.
}
{ _____________ } // This is an intermediate condition. Please fill in.
z = y - z;
{ z != 0 }        // This is the postcondition.
```