2005 Paper 10 Question 2

Foundations of Programming

(*a*) Distinguish between the terms *instance method* and *class method*.   [4 marks]

(*b*) A newcomer to Java programming has written the following code:

```
class Parent
 { public void test()
    { System.out.println("Parent");
    }
 }

public class Child extends Parent
 { public static void main(String[] args)
    { Parent p = new Parent();
      Child c = new Child();
      p.test();
      c.test();

      p = c;
      p.test();
      c.test();

      c = p;
      p.test();
      c.test();
    }

   public void test()
    { System.out.println("Child");
    }
 }
```

The `javac` compiler complains about one statement. Which one and why?
Correct the code by inserting an appropriate cast.   [4 marks]

(*c*) With this correction the program will compile and run. Explain in outline
what happens at run-time and show what output is printed.   [5 marks]

(*d*) Small print in the Java documentation says that you "cannot override a `static`
method but you can hide it". If both `test()` methods are made `static` the
program will again compile and run. Explain what happens this time and
show what output is printed.   [7 marks]

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