Foundations of Programming

(a) Using the program below to illustrate your answer, explain the terms *inheritance* and *instantiation.* [6 marks]

(b) In what order are the constructors and methods in the following program called? What output would you expect? [14 marks]

```java
public class SetUp
{
    public static void main(String[] args)
    {
        Child alf = new Child(11);
        System.out.println("alf.H is " + alf.getH());
    }
}

class Child extends Parent
{
    private int H;

    public Child(int j)
    {
        super(j); this.setH();
    }

    public void set(int j)
    {
        super.set(j); this.setH();
    }

    private void setH()
    {
        this.H = 2*this.getK();
        System.out.println("*** H is now " + H + " ***");
    }

    public int getH()
    {
        return this.H;
    }
}

class Parent
{
    private int J, K;

    public Parent(int j)
    {
        this.set(j);
    }

    protected void set(int j)
    {
        this.J = j;
        System.out.println("*** J is now " + J + " ***");
        this.setK();
    }

    private void setK()
    {
        this.K = 2*J;
        System.out.println("*** K is now " + K + " ***");
    }

    public int getK()
    {
        return this.K;
    }
}
```