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Lösningsförslag till tentamen

Kursnamn	**Objektorienterade applikationer**
Tentamensdatum	**2014-03-13**
Program	**DAI2**
Läsår	**2013/2014, lp 3**
Examinator	**Uno Holmer**

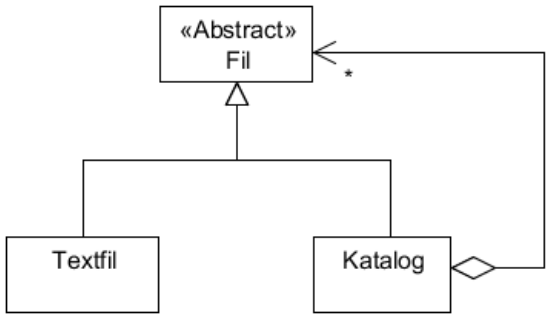
Uppgift 1

a) (3 p)

```
public class A {
    private B theB;
    public A(B b) { theB = b; }
}

public class B {
    private C theC = new C();
}

public class C {}

...
B b = new B();
A a1 = new A(b);
A a2 = new A(b);
```

b) (3 p)

Designmönstret kallas Composite.



Uppgift 2 (8 p)

```
public class CounterIterator<E> implements Iterator<E> {
    private Iterator<E> it;
    private long count = 0;

    public CounterIterator(Iterator<E> it) throws IllegalArgumentException {
        if ( it == null )
            throw new IllegalArgumentException(
                        "CounterIterator() applied to null");
        this.it = it;
    }

    // Delegate
    @Override
    public boolean hasNext() { return it.hasNext(); }
    @Override
    public void remove() { it.remove(); }

    // Override and delegate
    @Override
    public E next() {
        count++;
        return it.next();
    }

    // Returns the number of elements returned by next() so far.
    public long getCount() { return count; }
}
```

Uppgift 3

a) (5 p)

```
public class GameController {
    private GameLogic gameLogic;
    private Player player;
    private boolean gameOver;

    public GameController(GameLogic gameLogic,Player player) {
        this.gameLogic = gameLogic;
        this.player = player;
        gameOver = false;
    }
    public void nextClue() {
        if ( gameOver )
            return;
        if ( gameLogic.hasNextClue() )
            gameLogic.nextClue();
        else if ( gameLogic.hasNextQuestion() )
            gameLogic.nextQuestion();
        else
            gameOver = true;
    }
    public void userGuess(String guess) {
        if ( gameOver )
            return;
        player.addMarks(gameLogic.scoreUserGuess(guess));
        if ( gameLogic.hasNextQuestion() )
            gameLogic.nextQuestion();
        else
            gameOver = true;
    }
}
```

b) (5 p)

```
nextButton.addActionListener(
     new ActionListener(){
         @Override
         public void actionPerformed(ActionEvent e) {
             controller.nextClue();
         }});


guessField.addActionListener(
     new ActionListener(){
         @Override
         public void actionPerformed(ActionEvent e) {
             controller.userGuess(guessField.getText());
         }});


public void update(Observable o,Object arg) {
    if ( o instanceof GameLogic && arg instanceof String ) {
        String[] args = ((String)arg).split(":");
        questionLabel.setText(args[0]);
        clueArea.setText(args[1]);
        levelLabel.setText(args[2]+ " poäng");
        guessField.setText(null);
    } else if ( o instanceof Player && arg instanceof Integer )
        marksLabel.setText("Du har " + (int)arg + " poäng");
}
```

c) (4 p)

```
public static void main(String[] arg) {
    GameLogic logic = new GameLogic();
    Player player = new Player();
    GameController contr = new GameController(logic,player);
    Gui gui = new Gui(contr);
    logic.addObserver(gui);
    player.addObserver(gui);
    logic.reset();
}
```

Uppgift 4

a) (4 p)

```
public class Server {
    public Server(String port,String fileName) {
        try {
            ServerSocket servSock = new ServerSocket(Integer.parseInt(port));
            while ( true ) {
                Socket clientSock = servSock.accept();
                System.out.println("Server: client connectced");
                new ClientHandler(clientSock,fileName);
            }
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```

b) (6 p)

```
public class ClientHandler extends Thread {
    private ObjectInputStream in;
    private ObjectOutputStream out;
    private String fileName;

    public ClientHandler(Socket sock,String fileName) {
        try {
            in = new ObjectInputStream(sock.getInputStream());
            out = new ObjectOutputStream(sock.getOutputStream());
            this.fileName = fileName;
            start();
        }
        catch (IOException e) {
            e.printStackTrace();
        }
    }

    public void run() {
        try {
            while ( ! interrupted() ) {
                Object o = in.readObject();
                if ( o instanceof String && ((String)o).equals("GETPOS") ) {
                    GPSCoordinate coord =
                        new GPSCoordinate(readGPSCoordinate());
                    out.writeObject(coord);
                }
            }
        }
        catch (IOException | ClassNotFoundException e) {
            e.printStackTrace();
            return;
        }
    }

    // Given metod
    private String readGPSCoordinate() { ... }
}
```

c) (7 p)

```
public class Client extends Thread {
    private ObjectInputStream in;
    private ObjectOutputStream out;

    public Client(String hostIP,String port) {
        try {
            InetAddress iAddr = InetAddress.getByName(hostIP);
            Socket sock = new Socket(iAddr,Integer.parseInt(port));
            out = new ObjectOutputStream(sock.getOutputStream());
            in = new ObjectInputStream(sock.getInputStream());
            start();
        }
        catch (IOException e) {
            e.printStackTrace();
            System.exit(0);
        }
    }

    forts. ->
```

```
  public void run() {
        while ( ! interrupted() ) {
            try {
                sleep(1000);
                out.writeObject("GETPOS");
                Object o = in.readObject();
                if ( o instanceof GPSCoordinate )
                    System.out.println("Client: " + (GPSCoordinate)o);
            }
            catch (InterruptedException | IOException |
                   ClassNotFoundException e)
            {
                return;
            }
        }
    }
}
```

Uppgift 5

a) (5 p)

```
public class FilterFactory {
    private HashMap<String,Filter> filterMap = new HashMap<>();

    public void addFilter(Filter f) {
        filterMap.put(f.getClass().getName(),f);
    }

    public Filter getFilter(String name) {
        return filterMap.get(name);
    }

    public Filter loadFilter(String name) {
        try {
            Filter f = (Filter)(Class.forName(name)).newInstance();
            addFilter(f);
            return f;
        } catch (Exception e) {
            return null;
        }
    }

    public Set<String> getKeys() {
        return filterMap.keySet();
    }
}
```

b) (10 p)

```
private JMenu makeFilterMenu(String menuName) {
    filterMenu = new JMenu(menuName);
    JMenuItem i = new JMenuItem("Other");
    i.addActionListener(
        new ActionListener(){
            @Override
            public void actionPerformed(ActionEvent e) {
                addOtherFilter(askForName());
            }});
    filterMenu.add(i);
    for ( String filterName : filterFactory.getKeys() ) {
        final String name = filterName;
        i = new JMenuItem(filterName);
        i.addActionListener(
            new ActionListener(){
                @Override
                public void actionPerformed(ActionEvent e) {
                    (filterFactory.getFilter(name)).apply(image);
                }});
        filterMenu.add(i);
     }
     return filterMenu;
}

private void addOtherFilter(String name) {
    Filter filter = filterFactory.getFilter(name);
    if ( filter == null ) {
        filter = filterFactory.loadFilter(name);
        if ( filter != null ) {
            final Filter f = filter;
            JMenuItem i = new JMenuItem(name);
            i.addActionListener(
               new ActionListener(){
                   @Override
                   public void actionPerformed(ActionEvent e) {
                       f.apply(image);
                    }});
            filterMenu.add(i);
        } else
            JOptionPane.showMessageDialog(null,"No such filter","",
                                          JOptionPane.WARNING_MESSAGE);
    }
}

private String askForName() {
    return JOptionPane.showInputDialog(null,null,"Input filter name",
                                       JOptionPane.QUESTION_MESSAGE);
}
```