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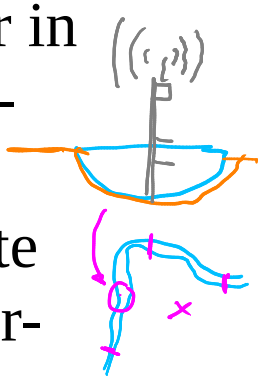
Object Oriented Analysis: Potential Classes and Methods [3 marks]

Read the following paragraph and pull out potential nouns that may lead to classes and verbs that may lead to relationships and methods according to Object Oriented Analysis.

We are monitoring the water-level of the North Saskatchewan River remotely. We have a sensor in the river that tweets to Twitter the current water-level of the river. Twitter doesn't allow us to manage this data very easily so what I do is write down the latest tweet in Excel and plot the water-level over time (per day).
I would like to have an application that does the work that I do by hand.



List the potential Classes:

List the potential Actions/Methods/Relationships:

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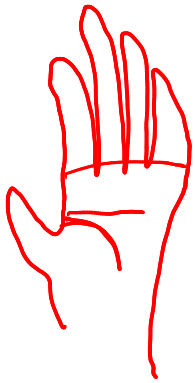
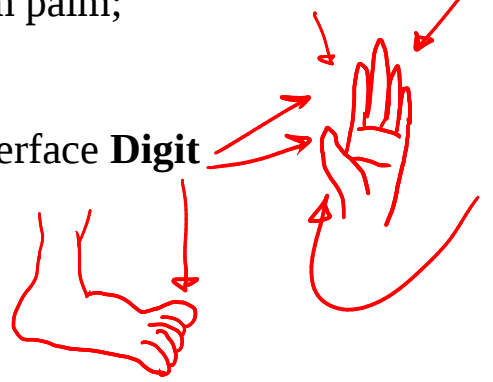


UML: Composition or Aggregation? [3 marks]

Convert this Java code to a **UML class diagram**. This Java meant to represent a Hand and it's identified fingers that were extracted from a image of a person's hand. Draw a well-designed UML class diagram to represent this information. Provide the basic abstractions, attributes, methods, relationships, multiplicities, and navigabilities as appropriate.

```
public class Hand
{
        Collection<Finger> fingers;
        Palm palm;
}

public interface Digit
{
        ...
}
```



```
// Fingers, Toes, Thumbs are
// all called Digits.
public class Finger implements Digit
{
        ...
}

public class Thumb extends Finger
{
        ...
}
```

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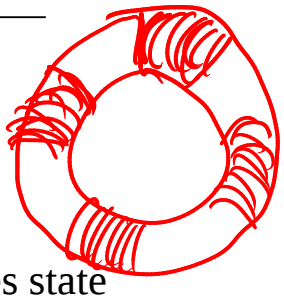


Use Cases and Use Case Diagram [3 marks total]

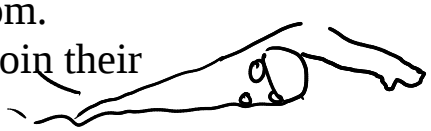
What are **three** primary use cases of the following situation: [1/3 marks]

Background:

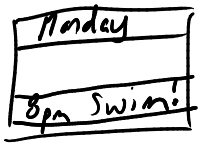
It is unsafe to swim alone. My apartment has a pool, but the rules state someone must not swim alone. I want to swim at 8pm tonight, but if no one is swimming I cannot swim safely.

Goals:

First I want to know if anyone has a swimming session at 8pm.
If someone has made a swimming session at 8pm I want to join their swimming session, and by doing so they should be notified.



If no one is swimming at 8pm I want to post a swimming session at that time, and then I will wait for someone to confirm that they will join me during that swimming session.



Use case 1:_____

Use case 2:_____

Use case 3:_____

Now complete this **UML use case diagram**, including boundary, actors, use case bubbles and relationships between actors and use case. [2/3 marks]

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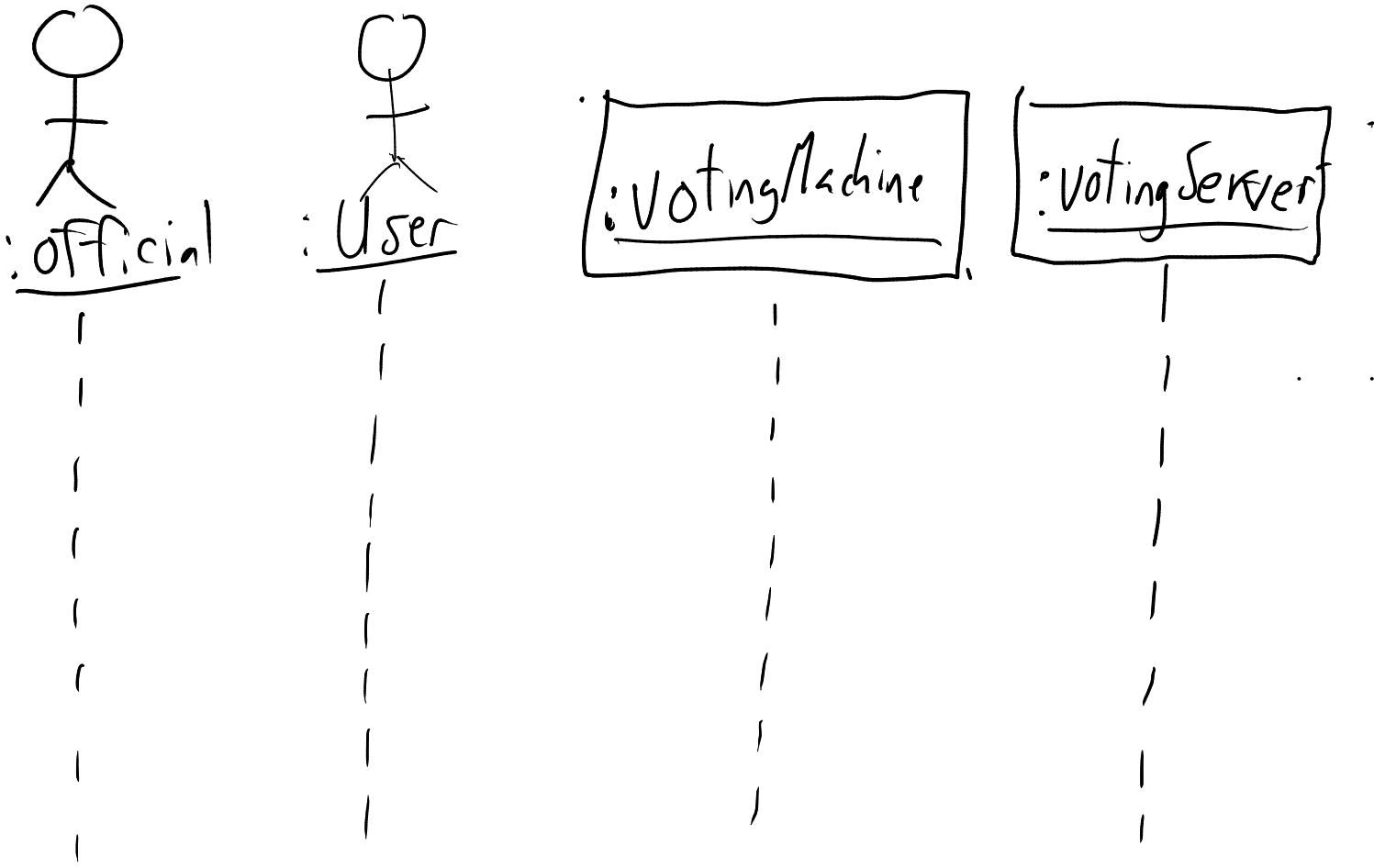
UML Sequence Diagrams: [3 marks]

Convert this use case into a **sequence diagram,** remember to include all the actors, the components, the lifelines and use good names for the methods.

Use Case: Voting at a Voting Machine

1. In order to vote for a mayor of Edmonton an **election official** has to *authorize* the **voting machine** to allow a mayoral vote.
2. I approach the **voting machine** and *click agree* that I am indeed allowed to vote.
3. The **voting machine** *displays* a list of mayoral candidates.
4. I *choose* one candidate and click on them, and then click *confirm*.
5. The **voting machine** thanks me, **records** my vote and **emails** it to the **voting server**.



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Software Engineering: [3 marks]

Explain what an **iteration** is within a software development process. [2 marks/3]

Here are 2 figures of two software development processes. Please label each figure with the name of the software development process. [1 marks/3]

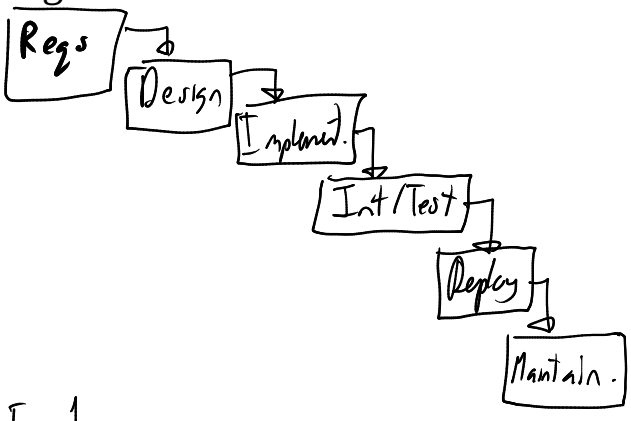

Fig 1. _____

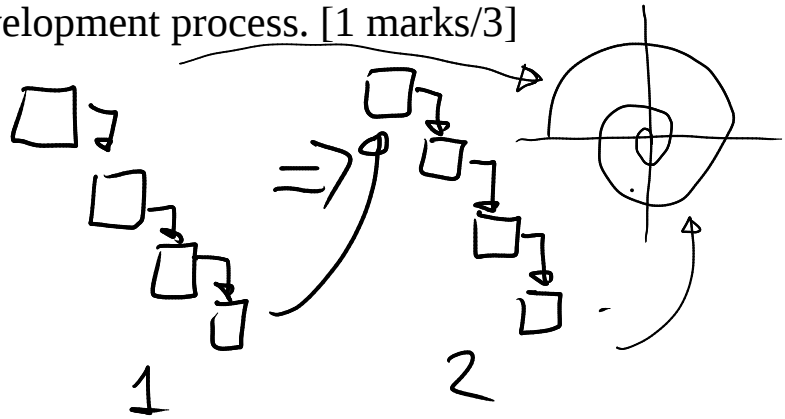

Fig2 _____