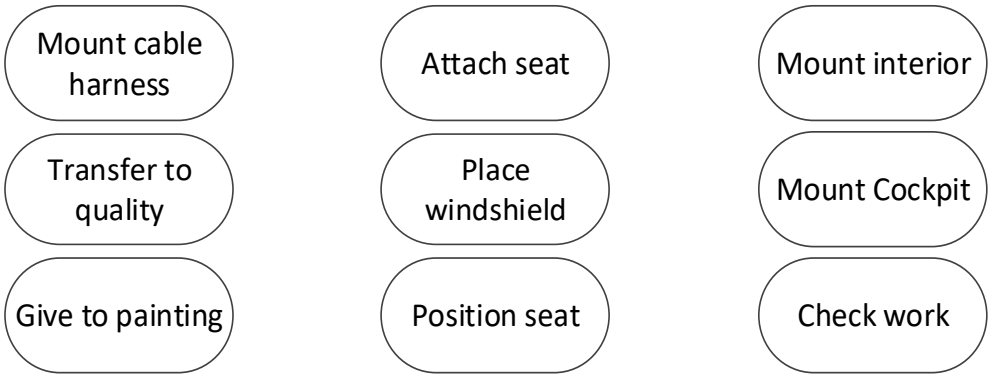
ASE Exercise 6 (Fall 2021)

Task 1 (Activity Diagram)

Draw an activity diagram using the following process description and the given activities. Use swim lanes!

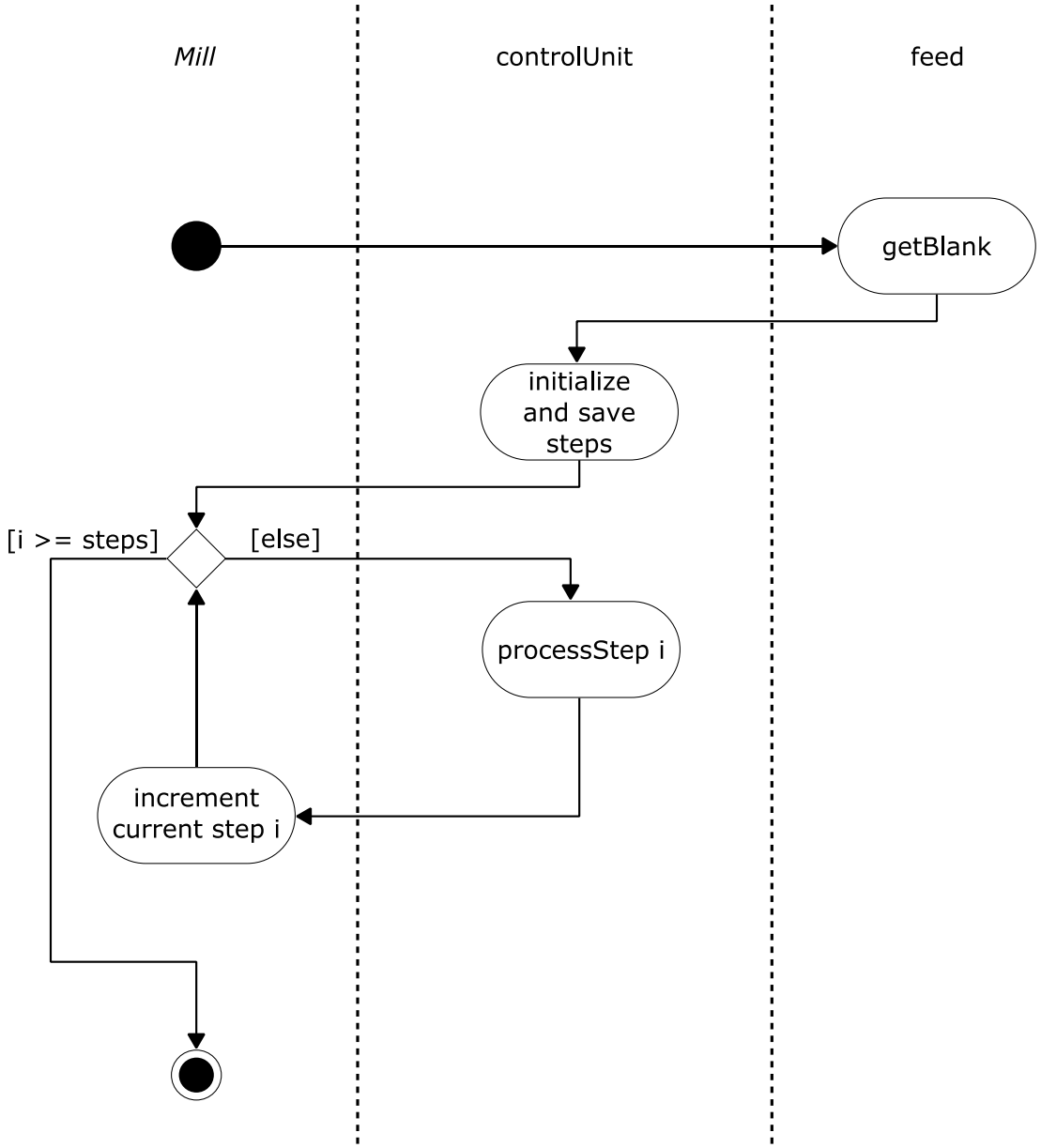
In modern factories workers and robots manufacture cars together.

- At first the cable harness is mounted.
- Next the robot mounts the cockpit.
- Next the seats are mounted one by one. At this step worker and robot work in parallel. This step is repeated until all seats are mounted:
  - While the robot positions the seat,
  - The worker attaches them.
- Once all seats are mounted, the worker mounts the interior.
- Next the interior is mounted followed by the robot placing the windshield.
- Following that the worker checks the carried out mounting work.
- If the car was selected as a random sample the car is transferred to quality control. Else the car is given to the painting station.



Task 2 (Activity Diagramm)

Implement the public method `millGear():void` of the class `Mill` according to the activity diagram shown below. The method initialize of the `controlUnit` returns the necessary number of steps. The method `processStep` also of the `controlUnit` passes the current value of the step counter. The other methods do not receive any parameters.



Task 3 (Class Diagram)

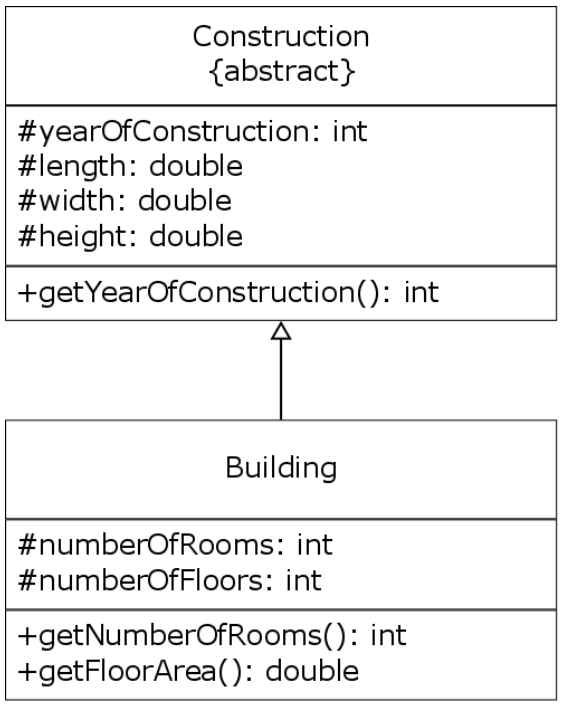
Create a simplified class diagram (only classes, relationships and cardinality, no methods or attributes within the class) using the following bullet points. Use the underlined terms as class names and show the relations of the classes through attributes, visibility and cardinality. Use meaningful names!

Note: Composite nouns are written in camel case, i.e. "CamelCase" within the class diagram.

- A car implements the interface vehicle.
- An electric car is a car.
- An electric car uses an actuator and a battery.
- An actuator uses one to two electric motors and two axes.
- A battery consists of one to several cells.

Task 4 (Class Diagram)

Implement the classes `Building` and `Construction` as specified by the following class diagram. The floor area is calculated by the number of floors times the building length times the building width.



Task 5 Programming

When you come home one night, you find a strangely dressed man outside your door. He introduces himself to you as **Hfjxfw** and beyond that, he is just saying crazy stuff. After you have gotten pen and paper, you start to write down his statements, taking the following notes.

Mjqqt, N 1nxm 3tz f 1tsijwkzq j0jsnsl.
N 1fx 1fnynsl tzyxnij 3tzw mtzxj gjhfzxj ymj ittw 1fxs'y qthpji.
N hfs fxxzwj 3tz ymfy st gzwlqfwx tw ymnj0jx mf0j jsyjwji.
N 1nxm 3tz f Rjww3 Hmwnxyrfx fsi f Mfuu3 Sj1 3jfw.

The next day, you are still stuck with the crazy chatter. When you look at your notes, you can immediately see how to crack the secret code. You sit down at your computer and start building a small algorithm for decrypting and encrypting. After you are done, you use your algorithm for decryption and are glad that there are still good people in our world.

Implement an algorithm to decrypt and encrypt text according to the above information.