

# Interaction Design

Chapter 2 (May 11, 2011, 9am-12pm):  
Approaches to IxD

# Approaches to Interaction Design

- The Purpose of Different Approaches
- Four Main Approaches
- User Centered Design (UCD)
- Activity Centered Design
- Systems Design
- Genius Design
- Case Study: Apple (Interaction-) Design and Business

# Recap: Designing for Everyday Life

(1) Professional Tools

(2) Game Machines for Teenagers

(1) Larger user groups  
(e.g. Kids/Parents/  
Grandparents)

(2) Various Contexts of  
use (e.g. Work/School/  
Home/Leisure)



**25 years ago**

**today**

# Approaches to Interaction Design and the Role of the **Users**

# INTERACTION DESIGN



Design-Led

**Expert Mindset**  
“users” seen as  
subjects  
(reactive informers)

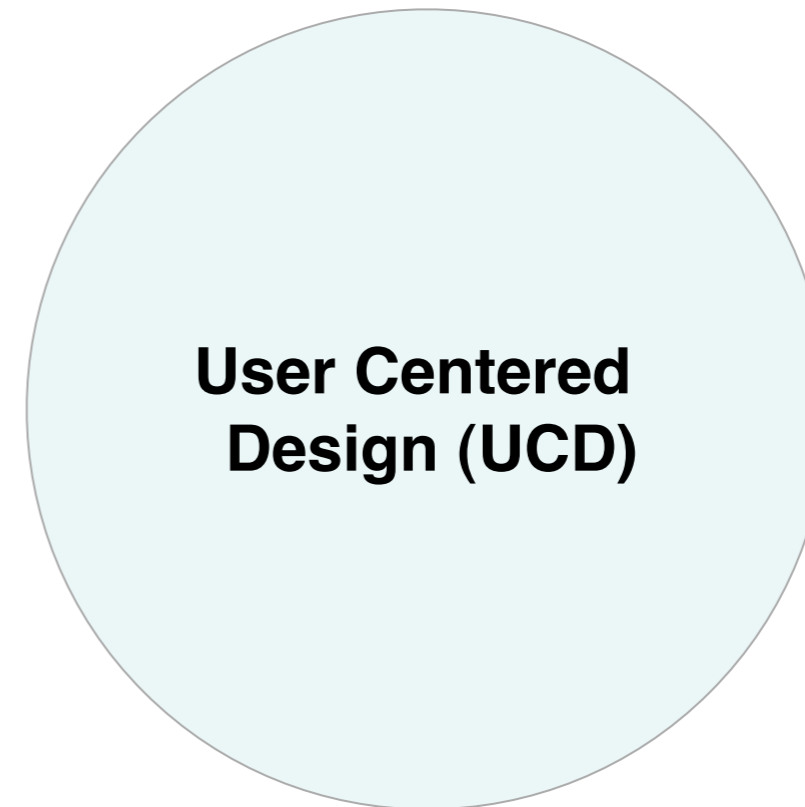
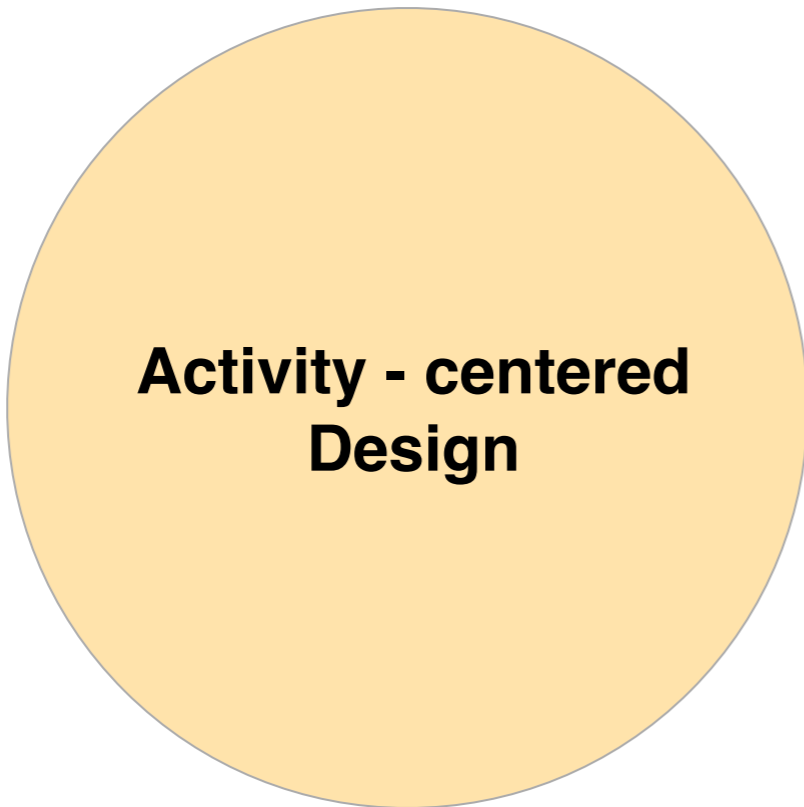
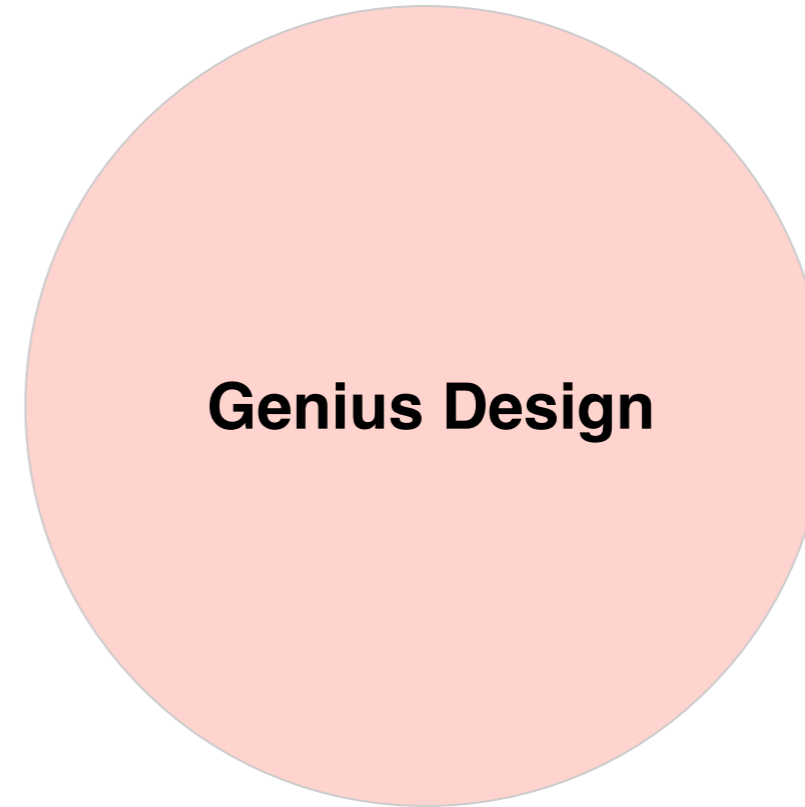
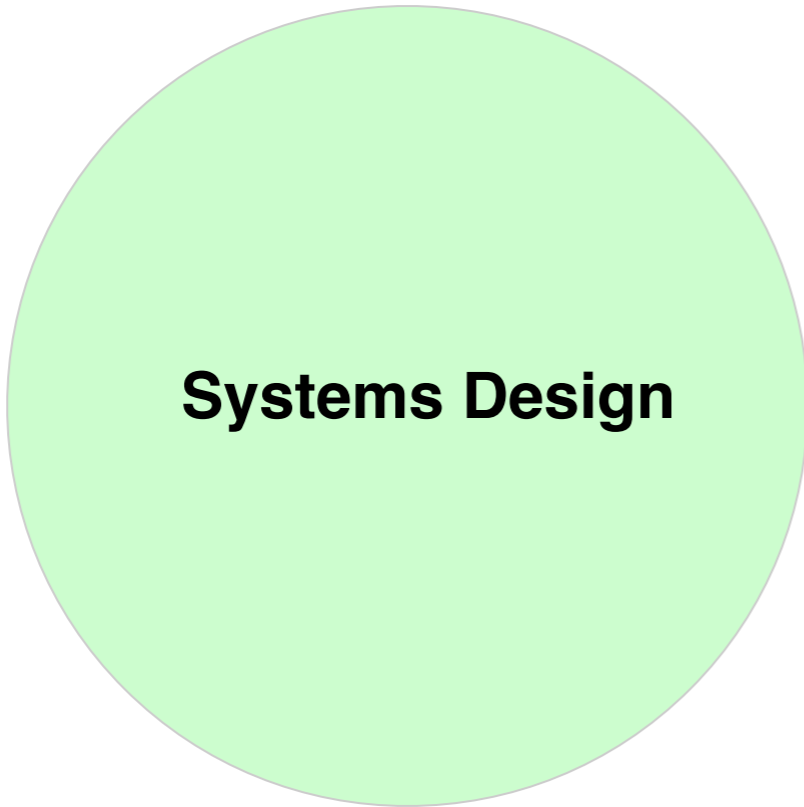
**Participatory Mindset**  
“users” seen as  
partners  
(active co-creators)

Research-Led

source: [6]

# Approaches to Interaction Design

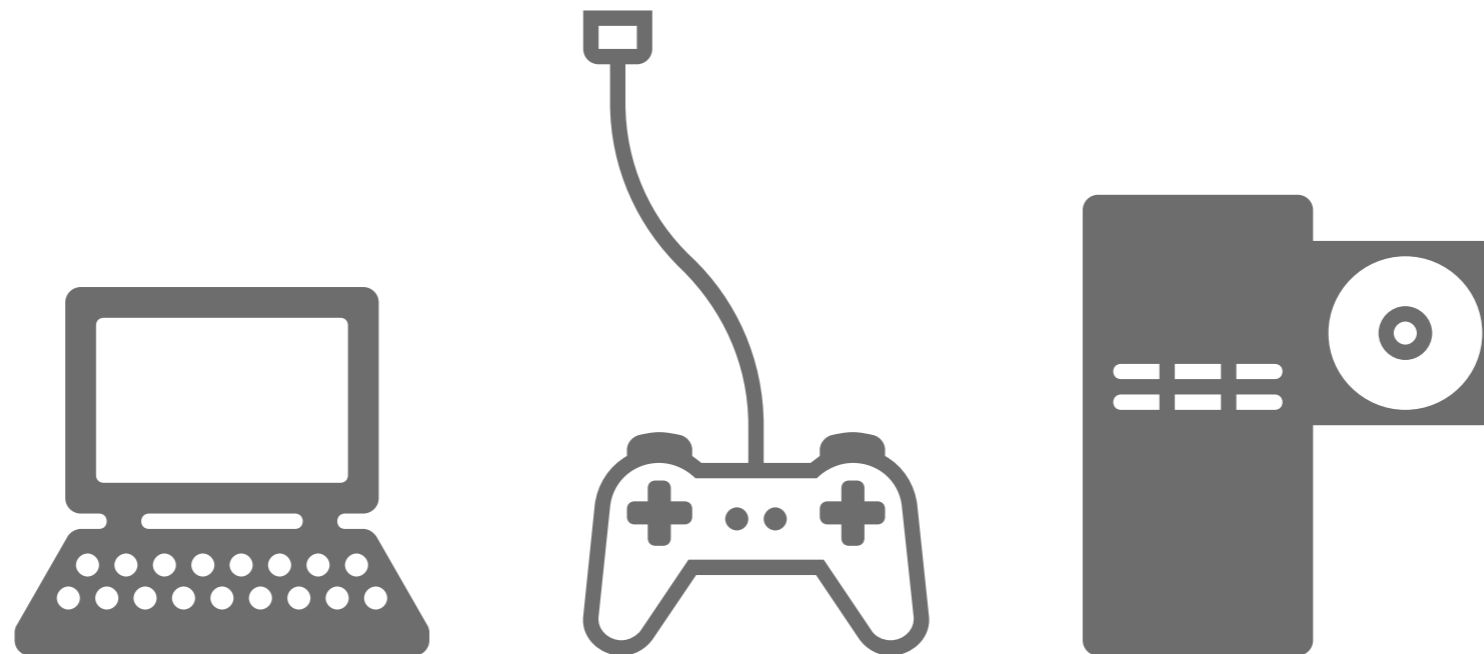
- The Purpose of Different Approaches
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source: [5]

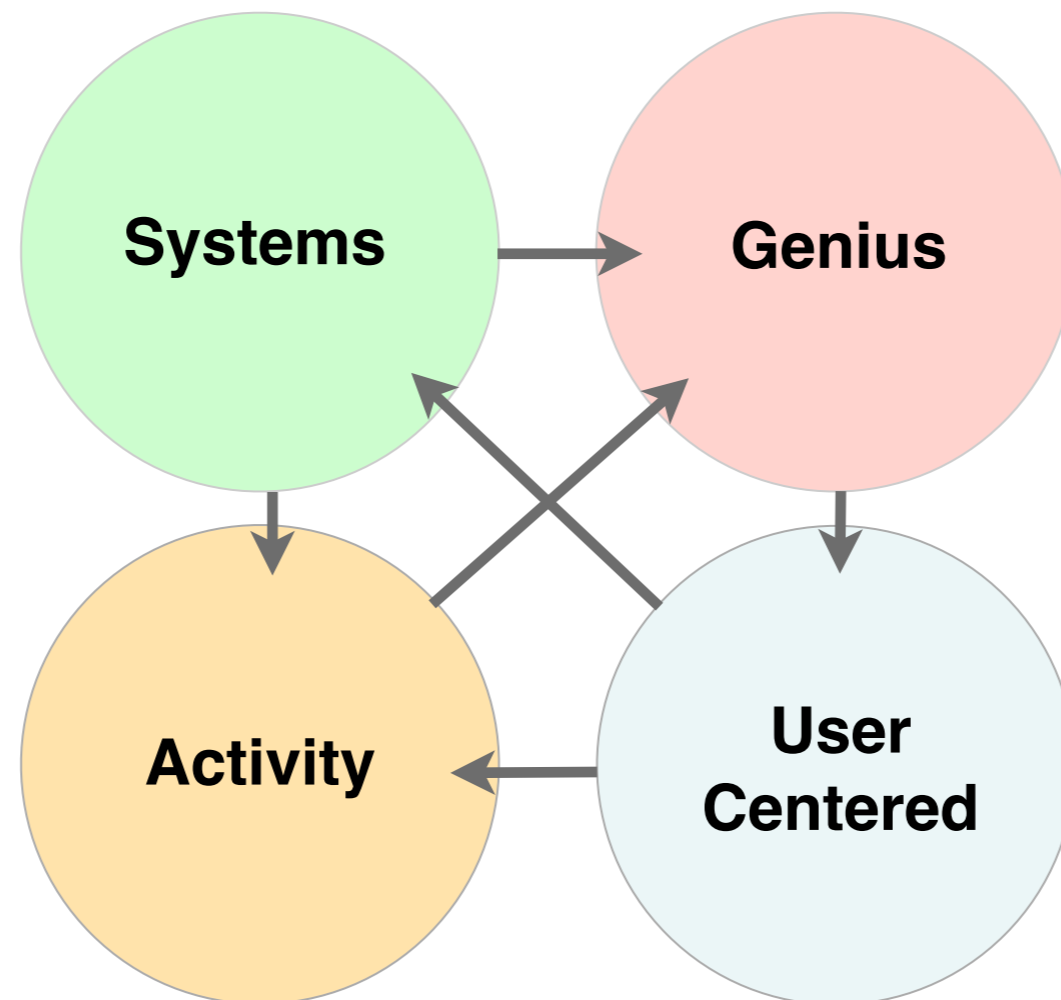


- can be used in many different situations to create vastly different products and services,
- e.g. Web sites, consumer electronics or nondigital services.



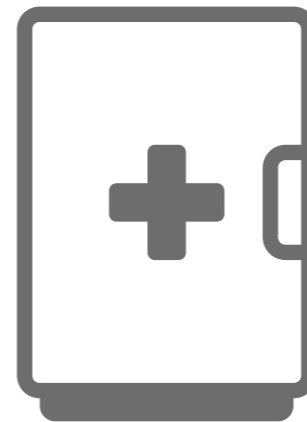
source: [5]

- move between approaches, applying the best approach to the right context
- sometimes applying multiple approaches even within a single project.



source: [5]

-problematic situations can be improved by developing at least one of these approaches



source: [5]

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**TABLE 2.1** Four Approaches to Design

<i>Approach</i>	<i>Overview</i>	<i>Users</i>	<i>Designer</i>
<b>User-Centered Design</b>	Focuses on user needs and goals	Guide the design	Translates user needs and goals
<b>Activity-Centered Design</b>	Focuses on the tasks and activities that need to be accomplished	Perform the activities	Creates tools for actions
<b>Systems Design</b>	Focuses on the components of a system	Set the goals of the system	Makes sure all the parts of the system are in place
<b>Genius Design</b>	Relies on the skill and wisdom of designers used to make products	Source of validation	Is the source of inspiration

---

source: [5]

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# Case Study:

## Paul Bradly

- designed the “Microsoft Mouse”
- followed an established “User-Centered Design Process” (UCD)
- helps Interaction Designers at IDEO developing their prototypes





# User Centered Design (UCD)

Philosophy: Users know best

- People who will be using a product or service know what their **needs, goals** and preferences are
- Designers aren't the users.
- Participation from users at every stage of the design process.
- Roots in industrial design and ergonomics:  
Industrial designer Henry Dreyfuss (Bell) popularized the method with his 1955 book "Designing for People".
- Software designers were long time unaware of the method

source: [5]



- With increased memory and processor powers and color monitors different forms of interfaces were now possible
- In the early 1980's a movement began **focusing on the users** not on computers.

source: [5]

# What is a user-centered approach?

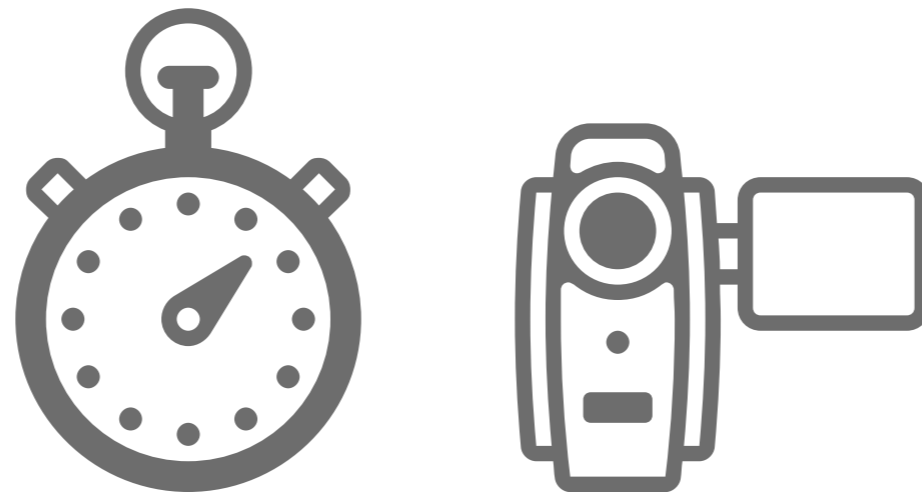
- User-centered approach is based on:
  - **Early focus** on users and tasks: directly studying cognitive, behavioral, anthropomorphic & attitudinal characteristics



source: [4]

# What is a user-centered approach?

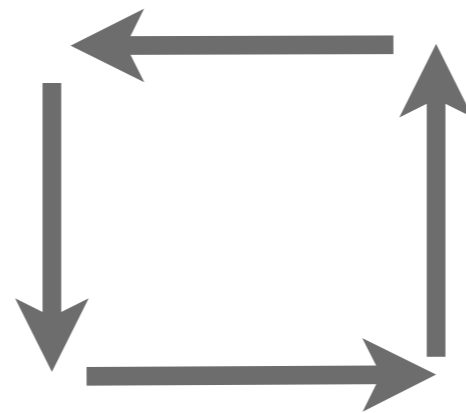
- User-centered approach is based on:
  - **Early focus** on users and tasks: directly studying cognitive, behavioral, anthropomorphic & attitudinal characteristics
  - **Empirical measurement:** users' reactions and performance to scenarios, manuals, simulations & prototypes are observed, recorded and analyzed



source: [4]

# What is a user-centered approach?

- User-centered approach is based on:
  - **Early focus** on users and tasks: directly studying cognitive, behavioral, anthropomorphic & attitudinal characteristics
  - **Empirical measurement:** users' reactions and performance to scenarios, manuals, simulations & prototypes are observed, recorded and analyzed
  - **Iterative design:** when problems are found in user testing, fix them and carry out more tests



source: [4]

# Four basic activities

- **Identifying needs and establishing requirements**



source: [4]

# Four basic activities

- **Identifying needs and establishing requirements**
- **Developing alternative designs**

1. 2. 3. 4.

source: [4]

# Four basic activities

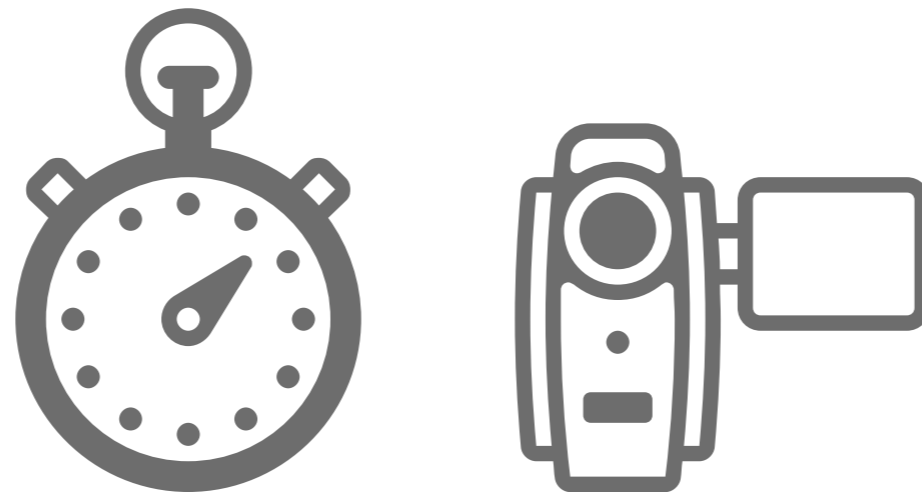
- **Identifying needs and establishing requirements**
- **Developing alternative designs**
- **Building interactive versions of the designs**



source: [4]

# Four basic activities

- **Identifying needs and establishing requirements**
- **Developing alternative designs**
- **Building interactive versions of the designs**
- **Evaluating designs**



source: [4]



# Summary:

-**Goals** are important in UCD -> interaction designer focus on what the user ultimately wants to accomplish.

-Interaction designer determines the user's task and means necessary to achieve those goals -> always with the users needs and preferences in mind

-Interaction designers involve users at every stage of the process

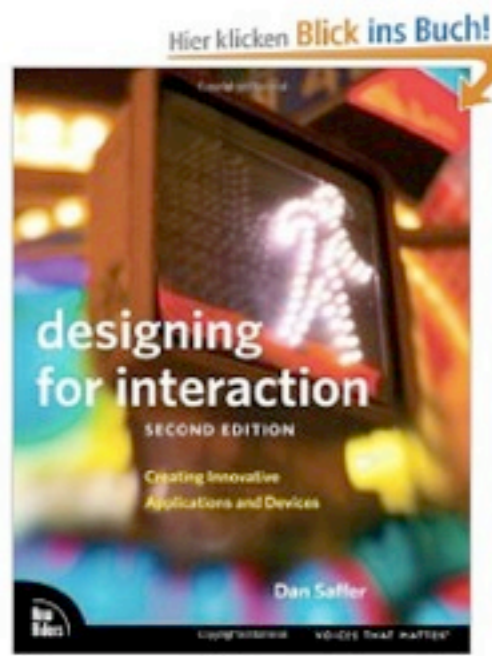
-Users are consulted of the very beginning of a new project

-Interaction designers conduct extensive research (Chapter 4) up front to determine what the users goals are in the current situation

-Interaction Designers test and try prototypes of a system with users

-**User data is a determining factor throughout the project when making decisions**

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**Preis für alle drei: EUR 93,90**

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# Case Study:

## Jeff Hawkins

- worked with the team that developed the first laptop, the Compass by GRID
- developed the first tablet PC, the GRIDpad
- started PALM computing
- is also a neurologist that focuses on the colleration be





# Activity Centered Design

Philosophy: Activities as the main design focus

- Activities are a **cluster of actions and decisions** that are done for a purpose (**tasks**)
- The purpose of an activity is not necessarily a goal
- Purposes are more focused and tangible than goals



<http://sociologycompass.files.wordpress.com/2009/02/800px-videogameretaildisplay.jpg>

## **Example: Activity of buying a new computer game:**

- > Decide to buy a new game
- > Decide what game to buy
- > Decide where to buy it
- > Get directions to store if necessary
- > Go to store
- > Enter store
- > Find a game in store
- > Buy game
- > Leave store
- > Go home



# Summary:

- The difference between a task and an activity can be fairly minor
- Some tasks have enough parts to them to be considered sub activities themselves
- Like UCD, activity centered design relies on research as the basis for its insights, albeit not as heavily
- Interaction designers catalog users' activities and tasks which leads to a specific design solution to help users accomplish the task, not achieve a goal per se
- The **activity**, not the people doing the activity **guides the design process**

source: [5]

-A danger in **activity-centered design** is that designers might not look for solutions for the problem as a “whole” (Not see the forrest for the trees)

source: [5]

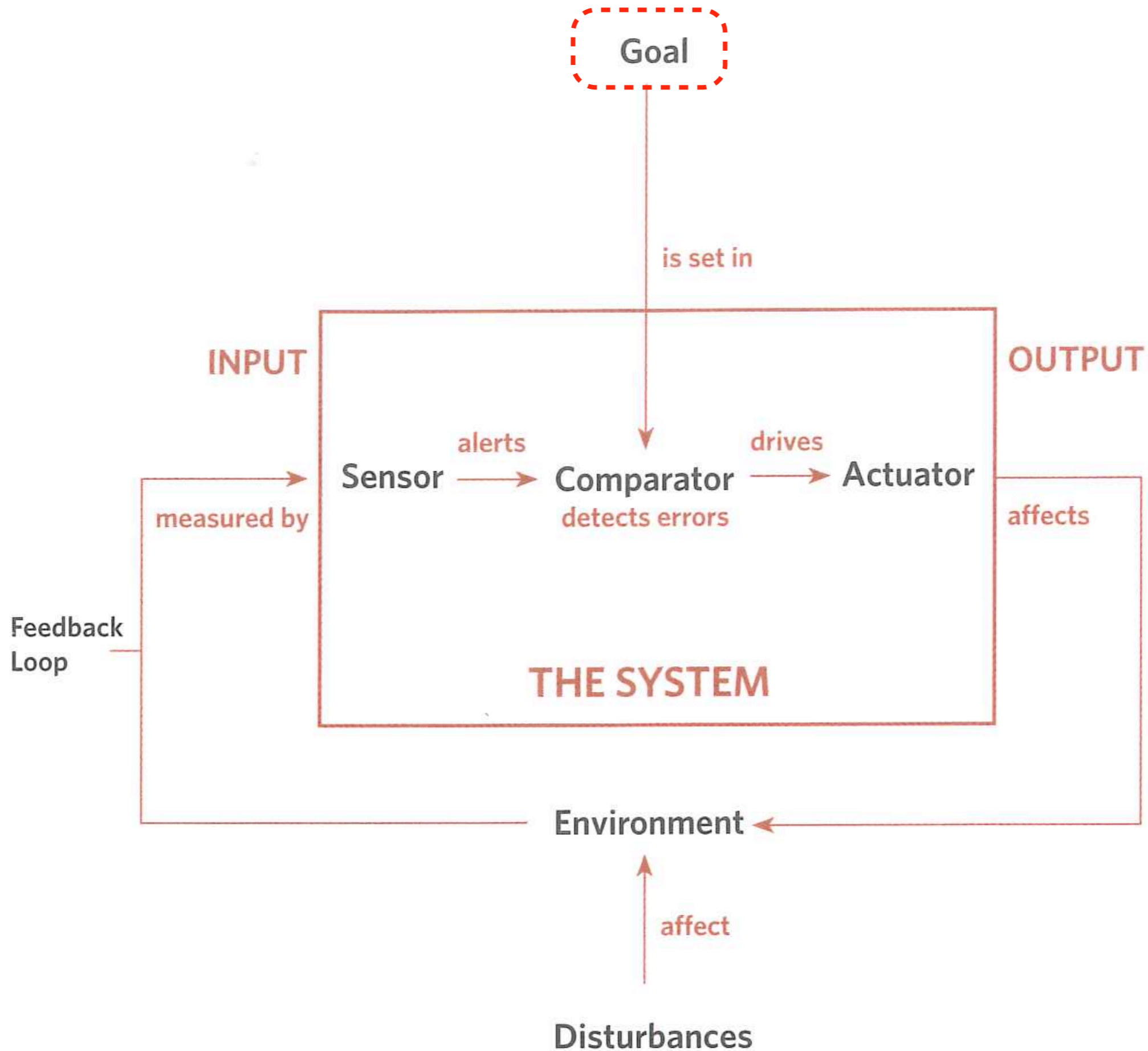
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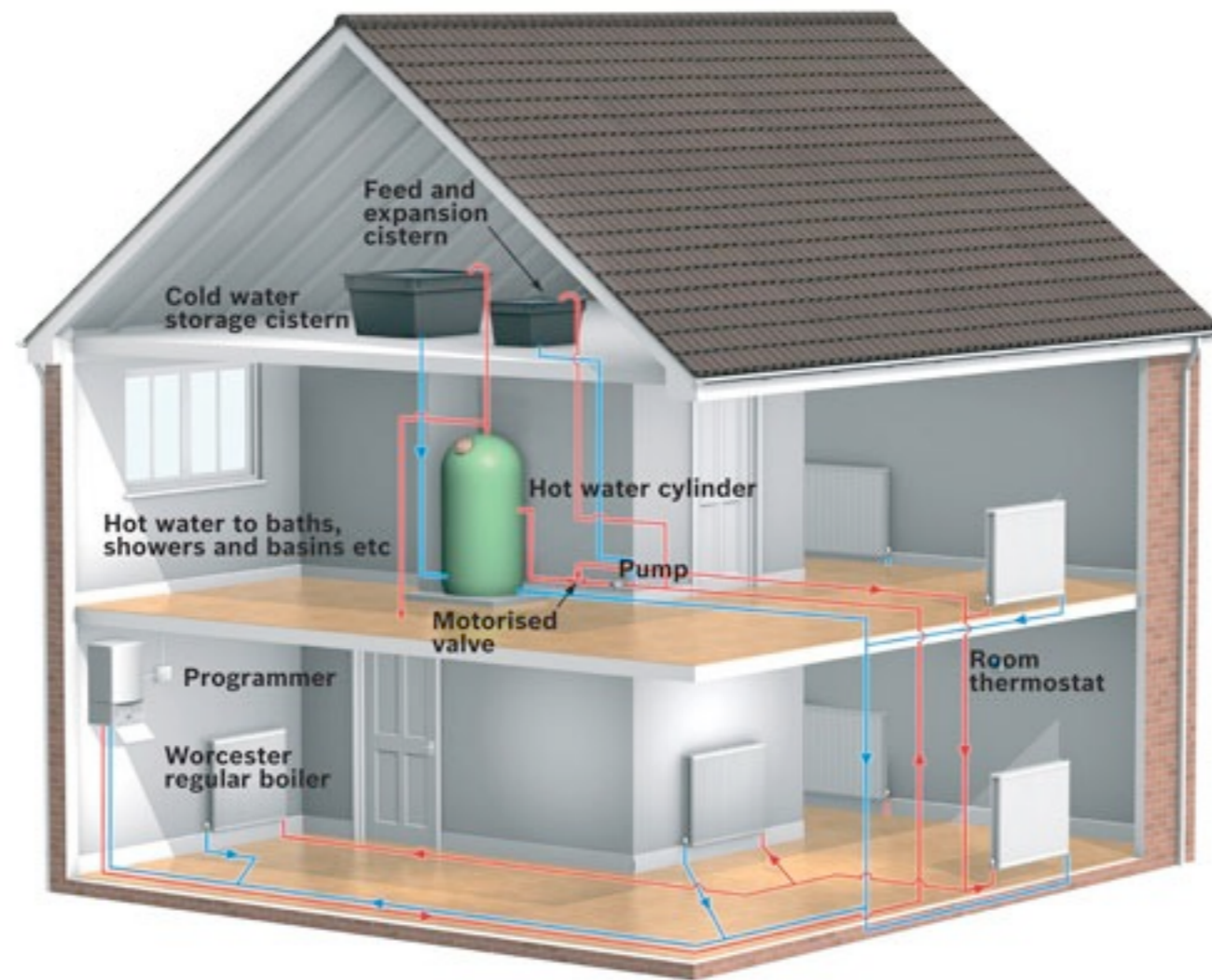
# Systems Design

- Analytical method of approaching design problems
- A set of entities that act upon each other is center of the design process
- Systems can range from simple (heating system in a house) to the enormously complex (power-plant)
- Systems design is a structured, rigorous design methodology
- Excellent for tackling complex problems
- Holistic design approach (focus on the context of use)
- Systems design outlines the components that systems should have:  
A **goal**, a **sensor**, a **comparator** and an **actuator** (these parts are shaped by the interaction designer)
- Compared to other approaches systems design provides a clear roadmap for designers to follow

source: [5]



source: [5]





# GOAL

**Goal** -> not the users' goal but the goal of a system as a whole  
-> can be drawn for users' goals

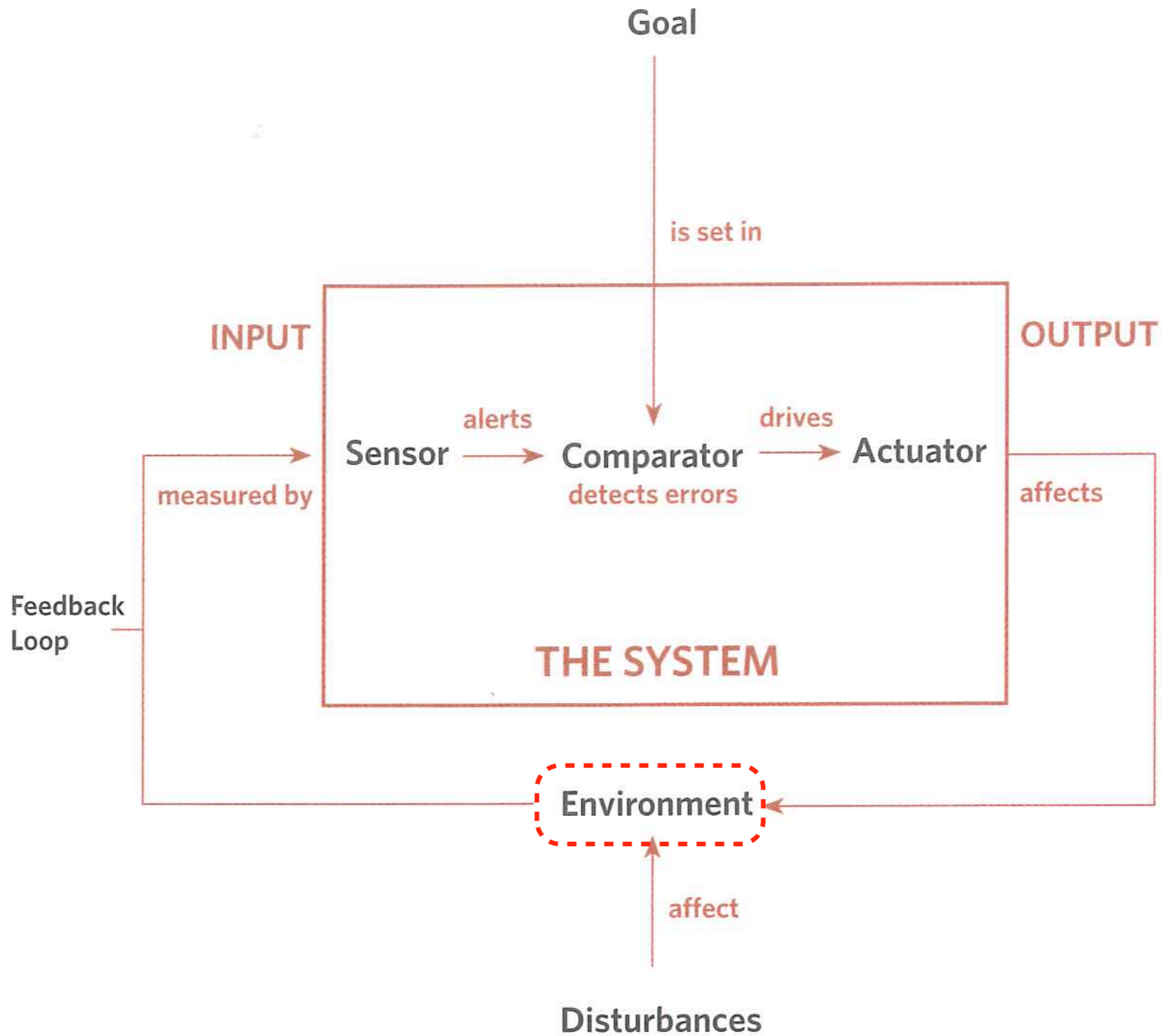
The Goal states the **ideal relationship** between the system and the environment it lives in





# ENVIRONMENT

photo credits © wikimedia



source: [5]

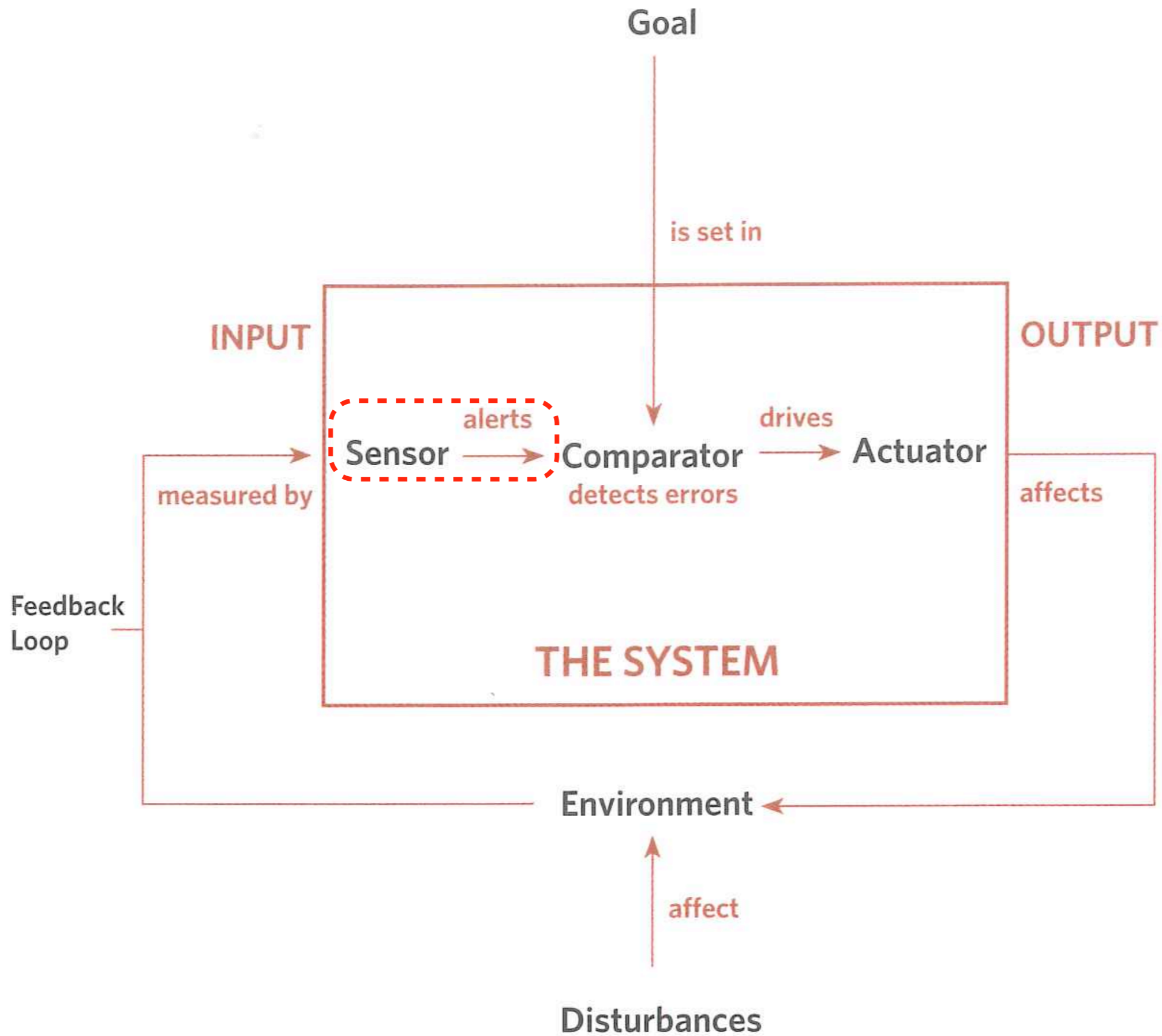
**Environment** -> Where does the system “live” ?

source: [5]



**Thermistor**

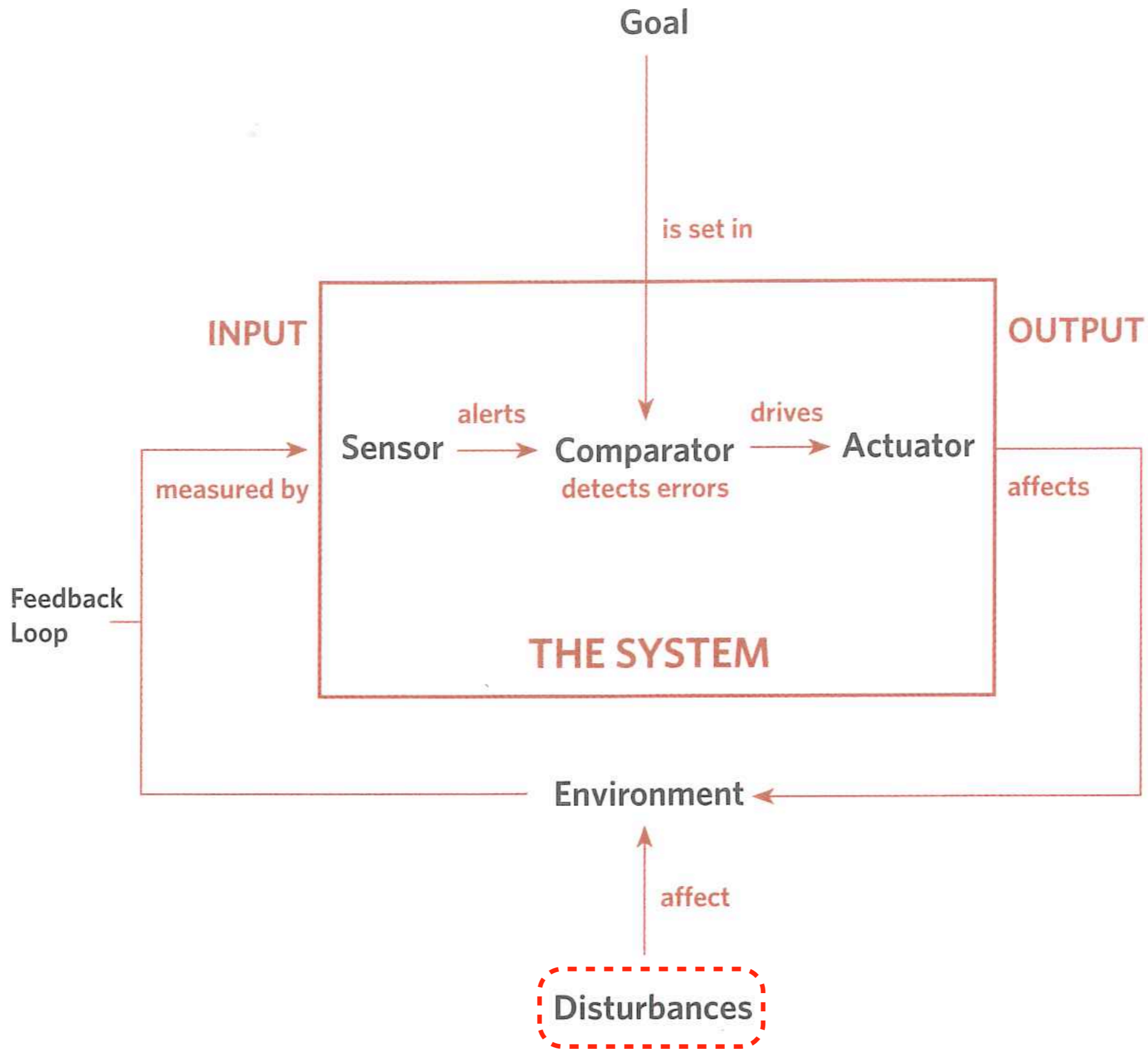
# SENSORS



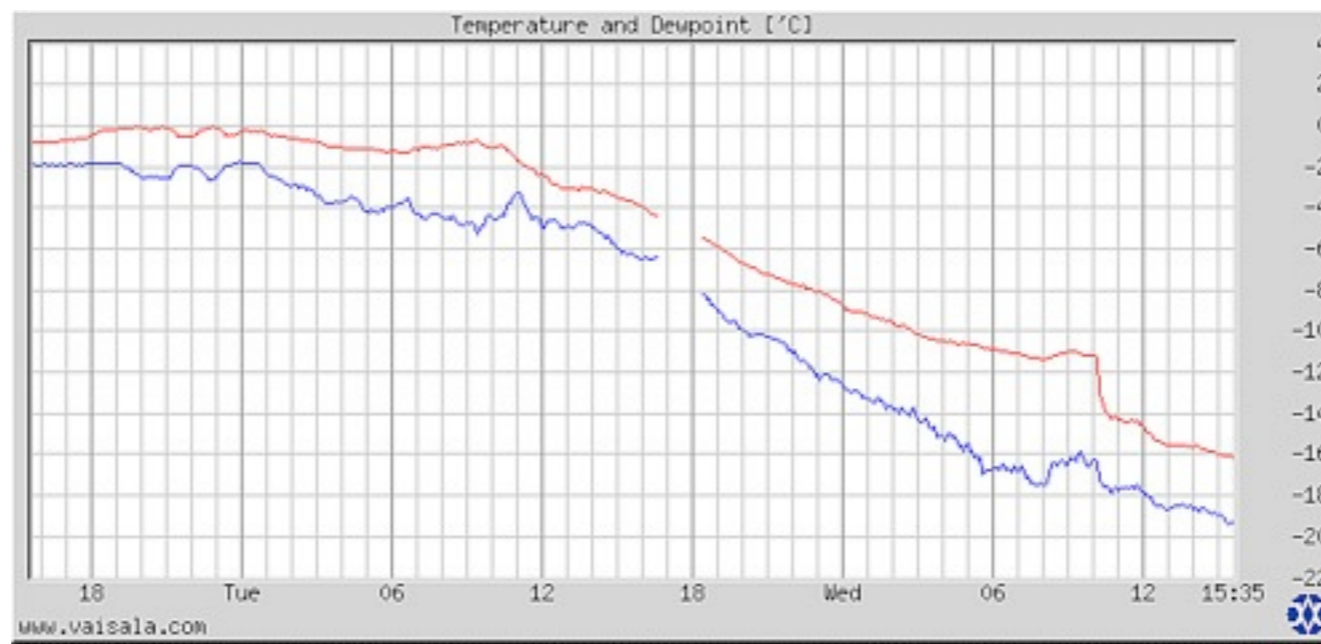
source: [5]

**Sensors** -> How does the system detect changes in the environment ?

source: [5]



source: [5]

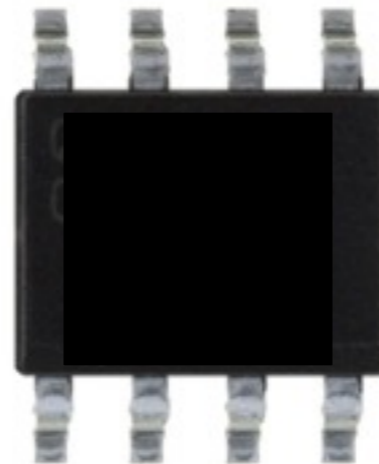


# DISTURBANCES



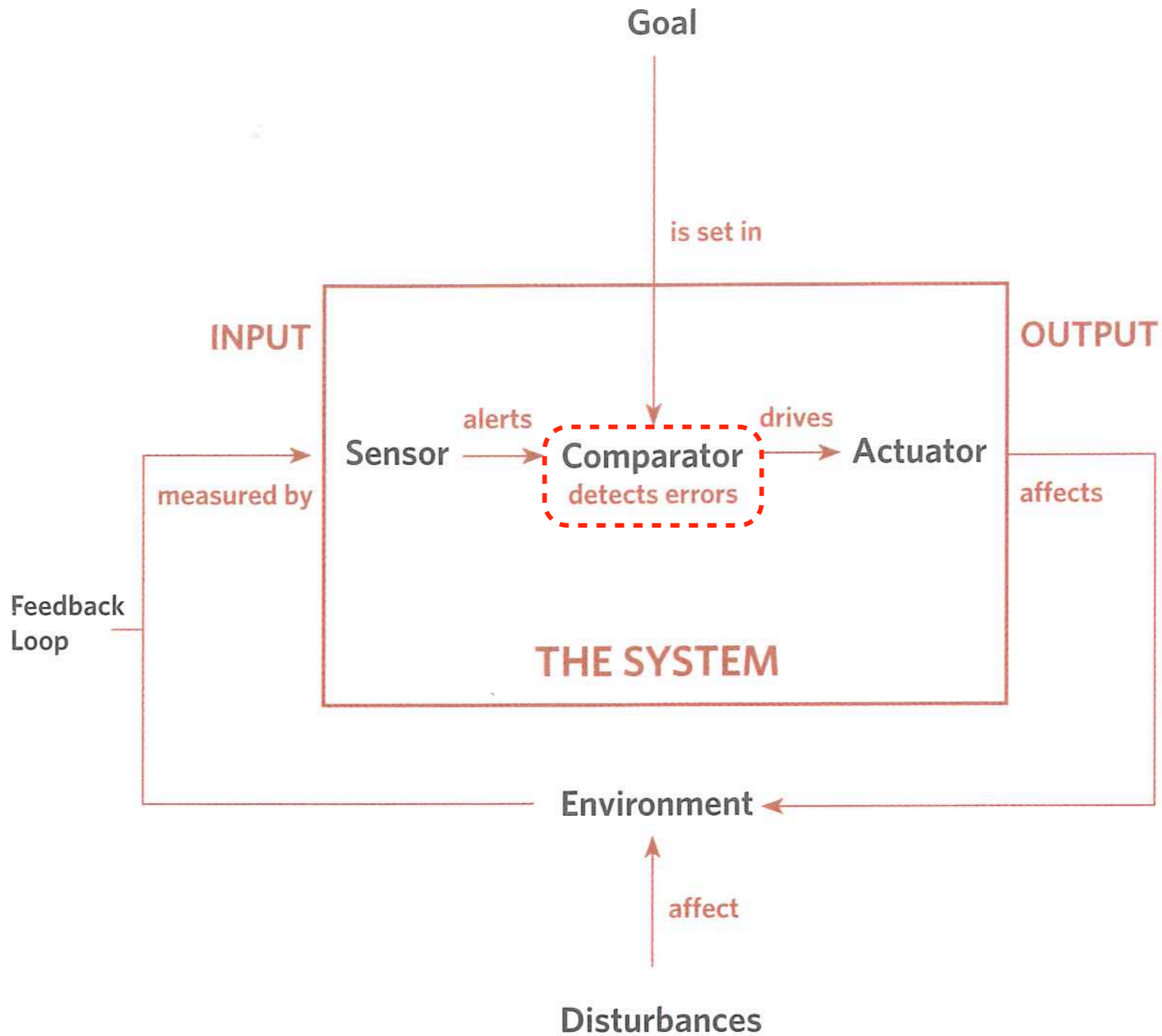
**Disturbances** -> Changes in the environment are called disturbances

source: [5]



# COMPERATOR

source: [5]



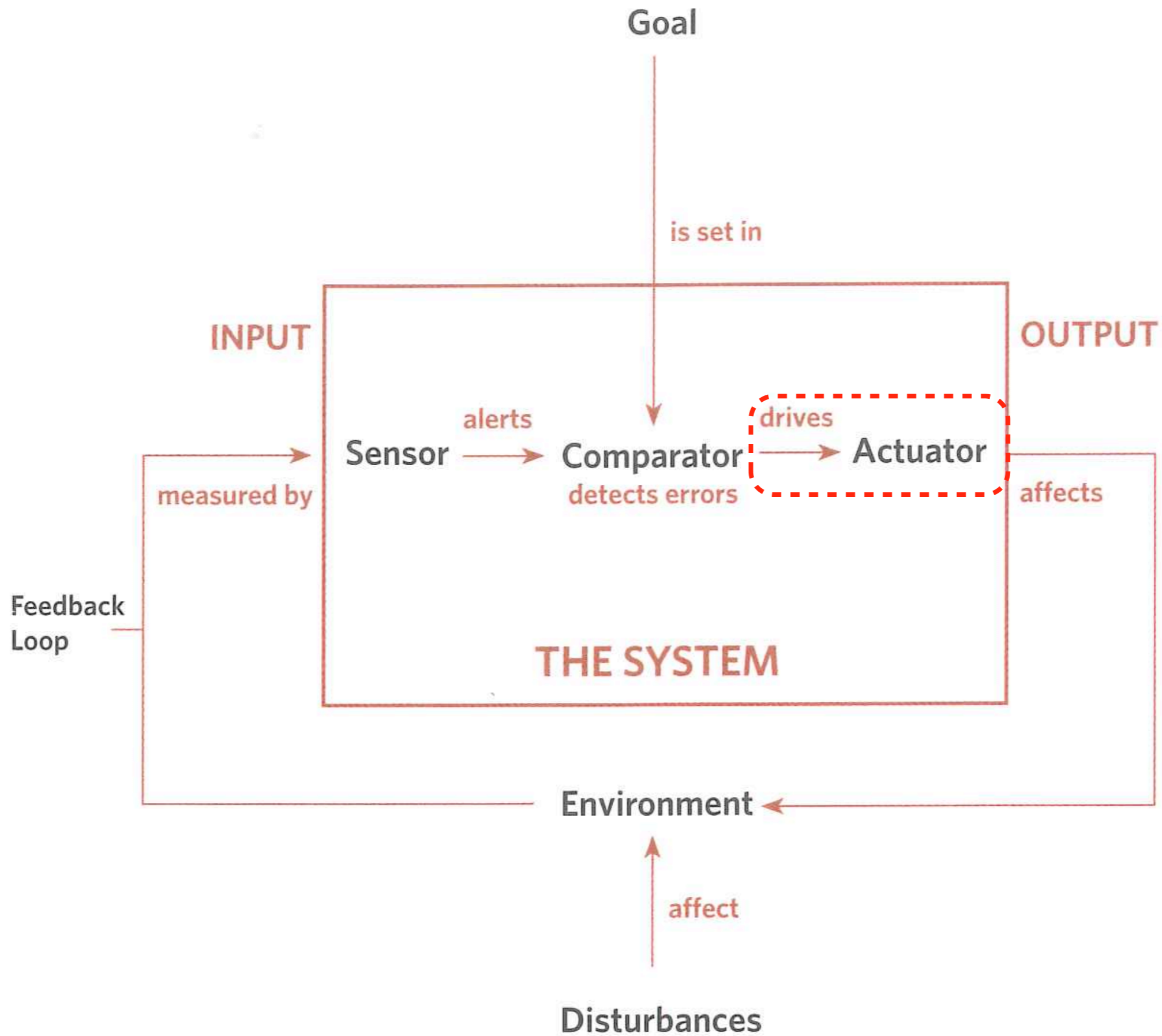
source: [5]

# Comparator

- > The comparator embodies the goal within the system
- > It compares the current state (the environment) to the desired state (the goal)
- > Any difference between the two is seen by the system as an error



# ACTUATOR



source: [5]

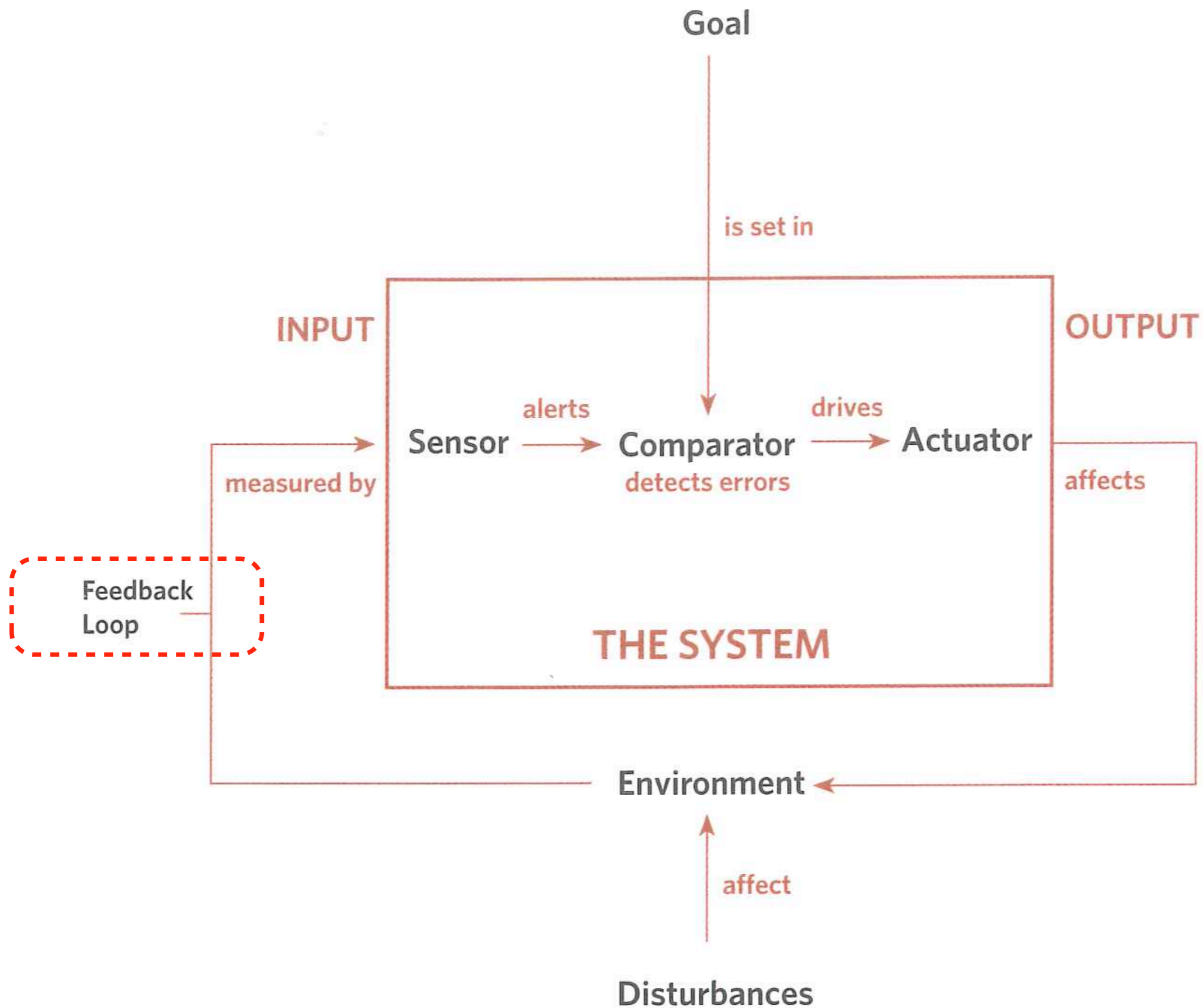
# Actuator

- > Actuators are means of making changes to the environment
- > It compares the current state (the environment) to the desired state (the goal)
- > Any difference between the two is seen by the system as an error



# FEEDBACK





source: [5]

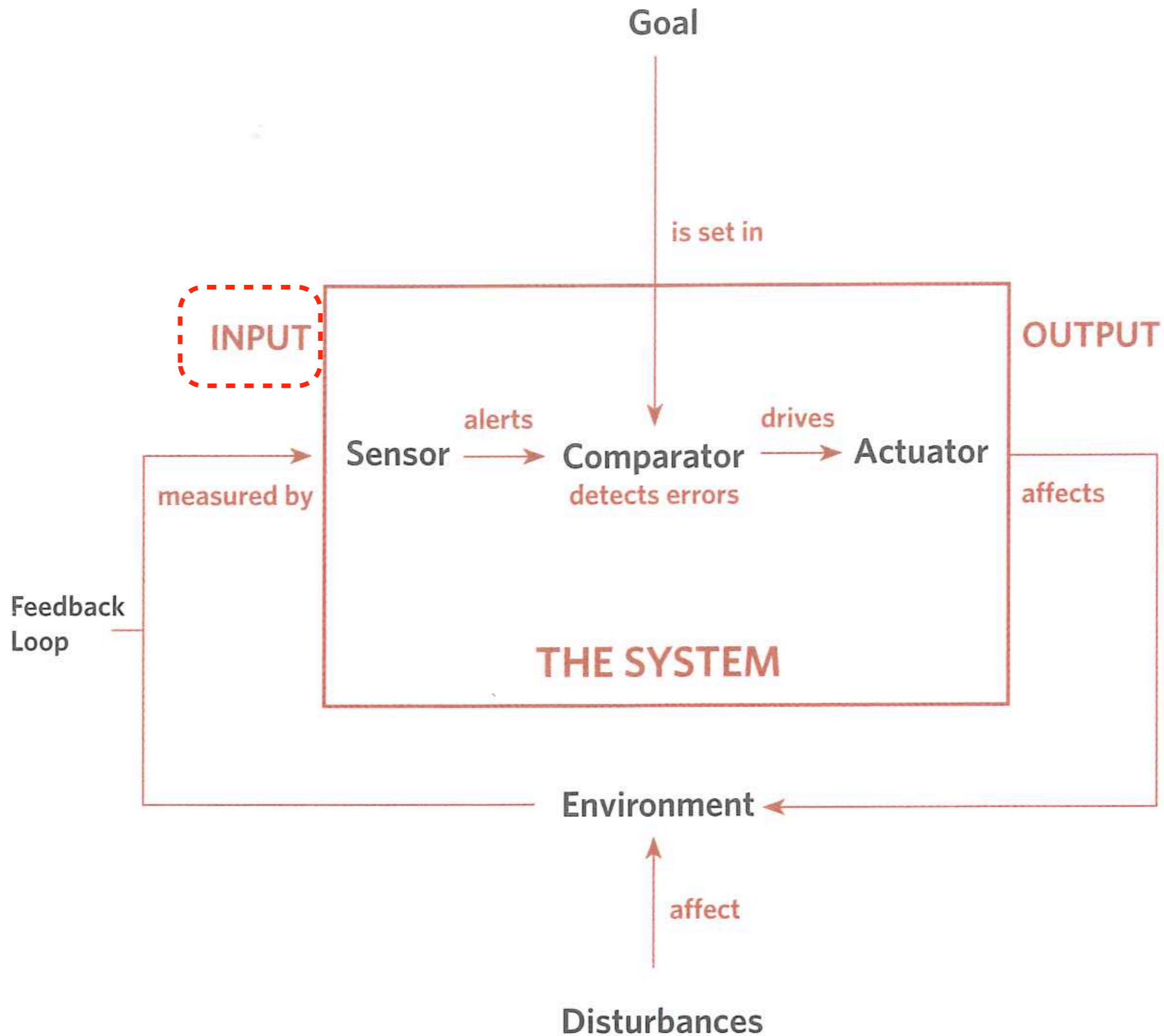
# Feedback

-> Feedback can consist of a message whether a goal was achieved or maintained-whether or not an error was detected

source: [5]



# CONTROLS



# Controls

-> Controls are means of manually manipulating parts of the system  
(except the environment)

source: [5]

# Unexpected disturbances

- > things that fall outside of the expected range of input
- >to make unexpected disturbances expected (and thus make the system more stable), systems need what's called ***requisite variety***
- >the system needs an assortment of responses to deal with a range of situations to prevent the system from failing
- >systems without requisite variety can crash

# Summary:

-> By focusing on the broad context of use and the interplay of the components, interaction designers gain a better understanding of a product or a service

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# Genius Design

Philosophy: Design relies almost solely on the wisdom and experience of the interaction designer making the design decisions.

- User involvement (if any) comes at the end of the process

- Probably best practiced by experienced designers who have encountered several types of problems and can draw solutions from previous design issues







# JONATHAN IVE

<http://www.loopinsight.com/wp-content/uploads/ive.jpg>

"Great design is as much about prospecting in the past as it is about inventing the future."

**Bill Buxton**



Beau Brownie Camera 1930



iPod Shuffle 2004



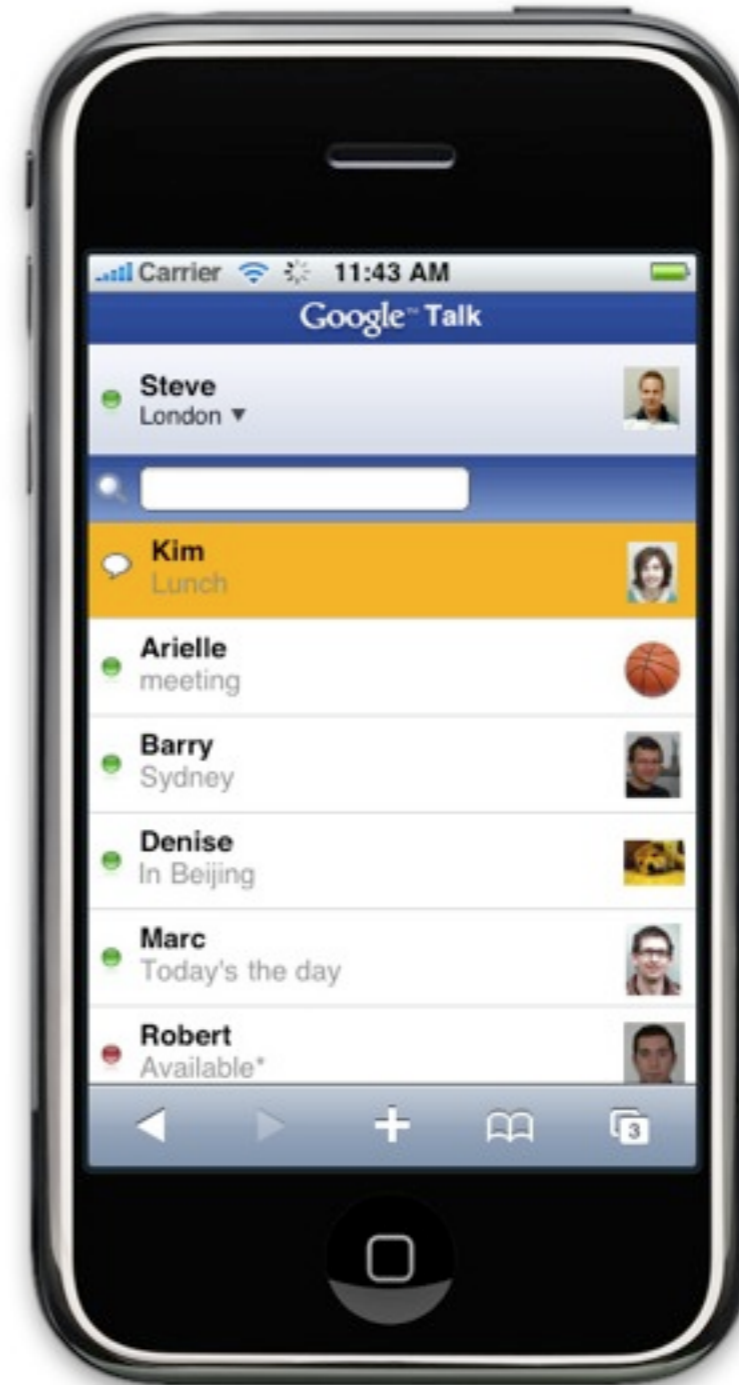
source: [8]

"A mobile device with a touch interface and only one physical button ?"





IBM Simon 1993



Apple iPhone 2007

source:[8]

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On December 20, 1996 Apple announced their intention to purchase **NeXT Computer**.....



source: [1]

Info	r	Open	o
File	F	Open as Folder	O
Edit	E	New Folder	n
Disk	D	Duplicate	d
View	V	Compress	
Tools	T	Destroy	r
Windows	W	Empty Recycler	
Services	S		
Hide	h		
Log Out	q		

Tools	
Inspector...	
Finder	f
Processes...	P
Console	C



# NeXT Computer GUI

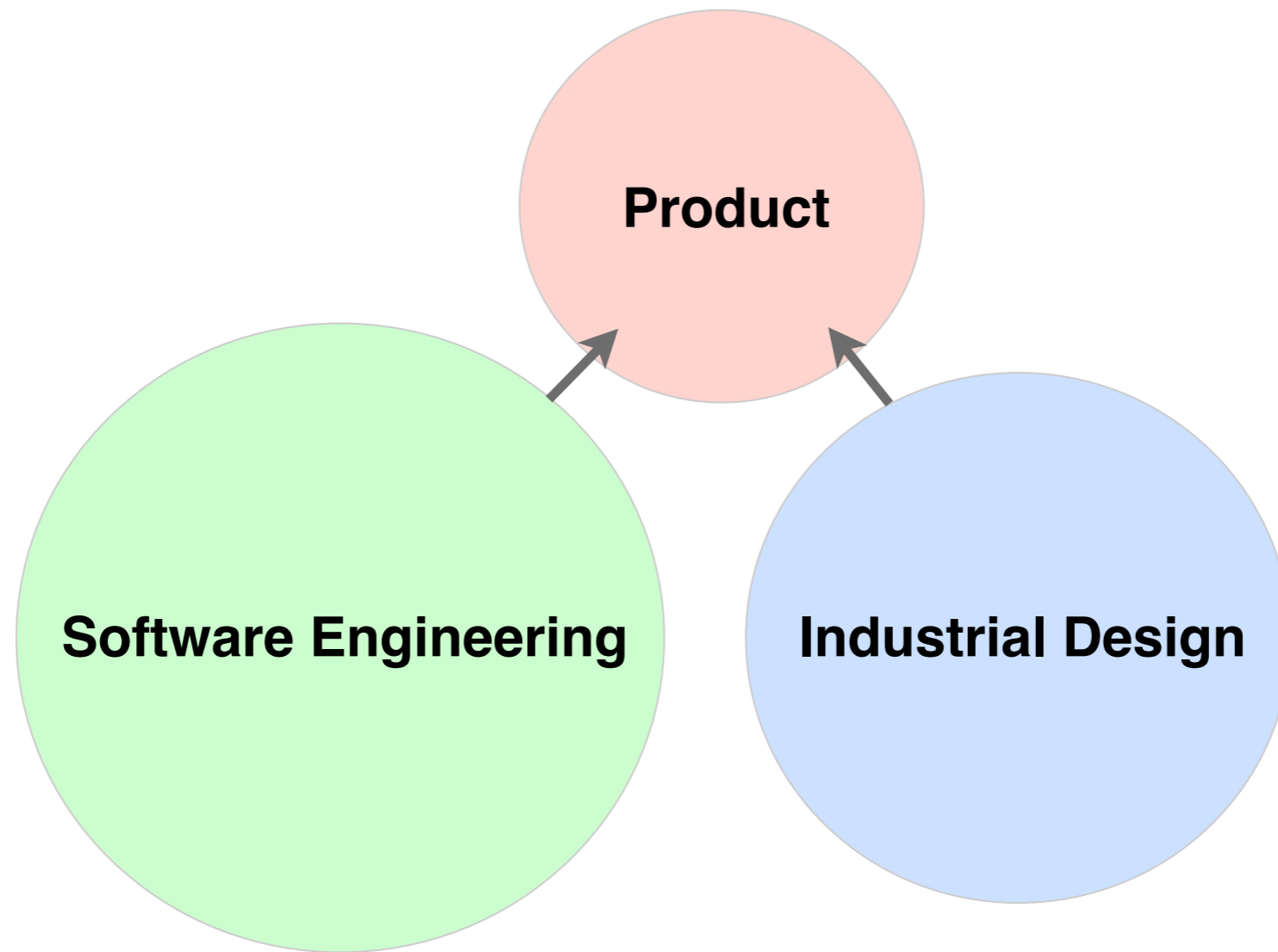


Steve Jobs



63.99

<http://www.spd.org/images/blog/Wired%20Feb%201996.jpg>

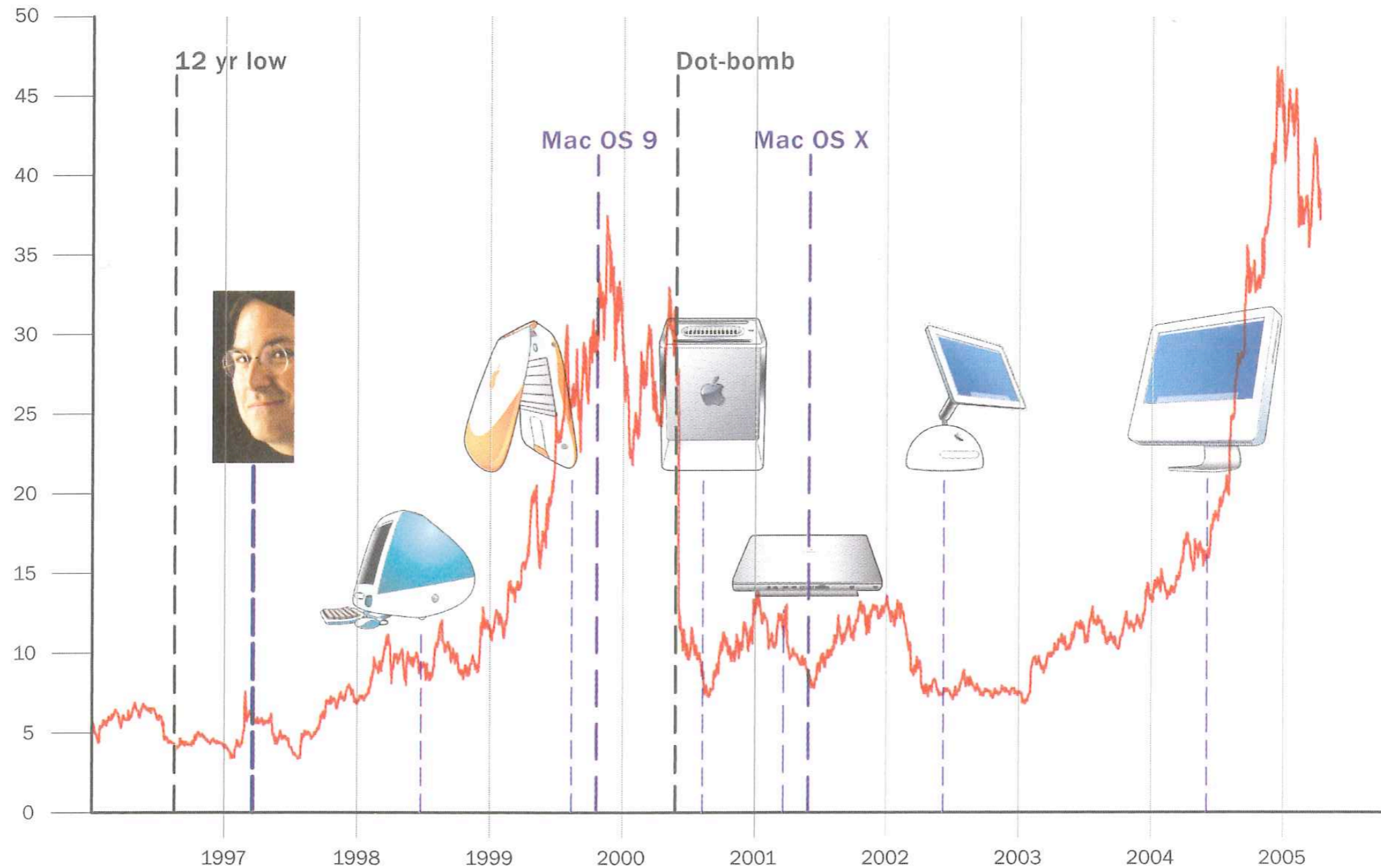




## iMac (1st Generation)

Buxton's eight points that are particularly relevant in the story of the iMac:

## 1.) Design saved Apple



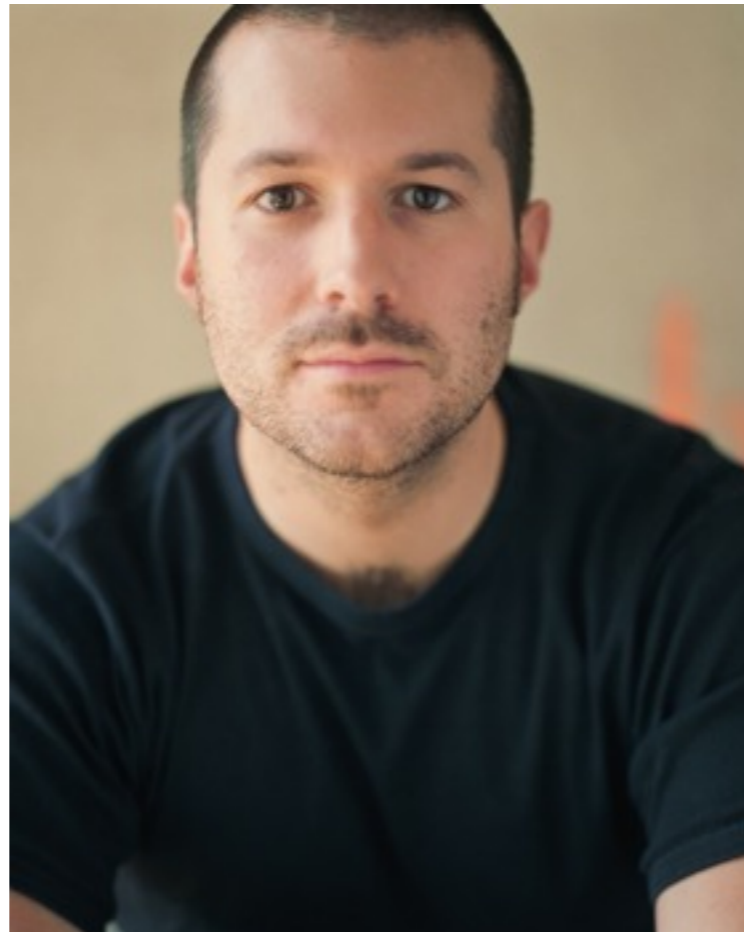
source: [1]



Buxton's eight points that are particularly relevant in the story of the iMac:

## **2.) The design innovation was done with the existing team**

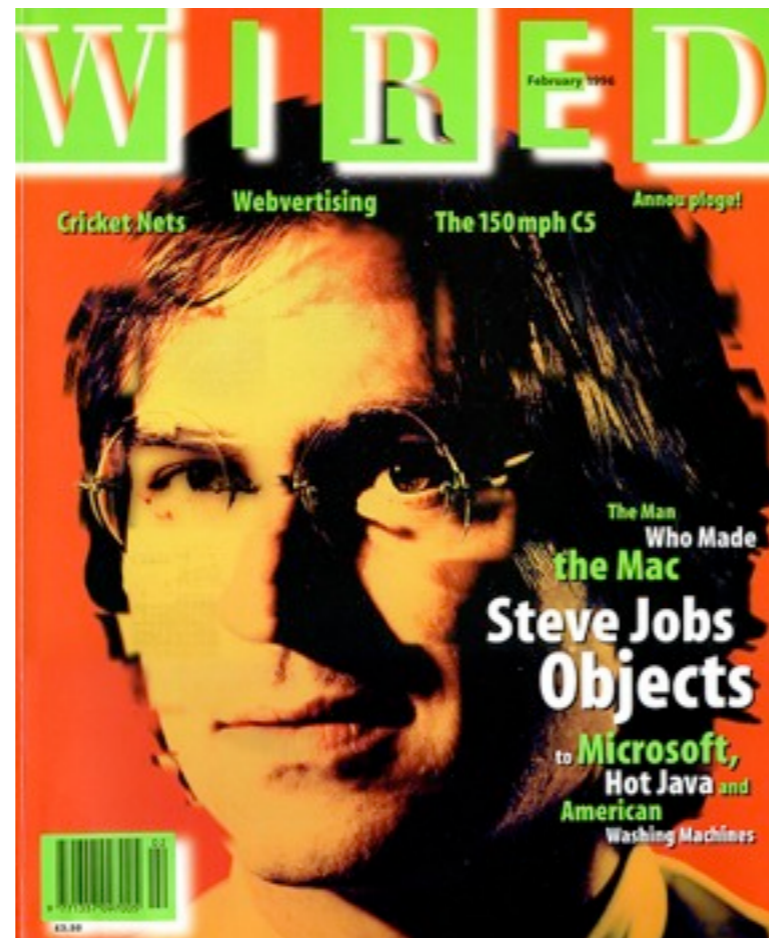
One of the prime talents (Ive) that helped save the company was in its employ through the full period of its slide to near oblivion!



Buxton's eight points that are particularly relevant in the story of the iMac:

### 3.) Executive vision was critical to success

If you do not have the vision (Industrial design as a key factor), will and power at the highest level, then talent is almost certain to remain wasted as it is frustrated.



source: [1]

Buxton's eight points that are particularly relevant in the story of the iMac:

## 4.) Momentum was sustained and rapid

The innovation was constant and rapid, and the design language of the products kept changing and developing. It ranged from the candy colored translucency of the original iMac to the minimalist form of the Power Mac Cube.



Buxton's eight points that are particularly relevant in the story of the iMac:

## 5.) There were failures

The key problem with the mouse was its uniform circular shape. It looked beautiful, and was in keeping with the rest of the computer. However the regularity of its circular shape provided no **affordances**, or tactile cues, that let you know its orientation when you grabbed it.



Buxton's eight points that are particularly relevant in the story of the iMac:

## 6.) The failures were key to success

If Jobs had played it safe, and not risked periodic failure, he never would have succeeded in the way he did. Things will not always go right, and Jobs factored that into his plan - not as an error but as a valuable (and expensive) "learning experience". Jobs and Apple had to fail (but not always) in order to succeed.



Buxton's eight points that are particularly relevant in the story of the iMac:

## **7.) The design that led to success was largely in the realm of styling, bordering on the superficial**

The style of these machines gave them character that clearly resonated with people, and helped reshape their perception of what a computer might be for. But underlying these systems was the old familiar graphical user interface (GUI), with perhaps a bit of updating in graphical style.



Buxton's eight points that are particularly relevant in the story of the iMac:

## **8.) There was almost no interaction between industrial designers and user interface design**

The industrial designers knew that if there was a mouse, a keyboard, and display, then the user interface (UI) could be supported. Likewise the UI designers knew that their systems could, and must, run equally well on any of the company's platforms, regardless of industrial design.

Not only could the industrial design and interface teams work independently, Jobs actively discouraged communication of collaboration between them.

source: [1]

## Looking back...

- role of industrial design
- role of a visionary management

### challenges:

- it's going to be harder ever to separate the software aspects of the user interface from the physical aspects

### conclusion:

- holistic design, which truly integrates both of these aspects of the design, must be there in fact.



## Paul Mercer

- joined Apple in 1987
- developed the next generation from “Finder”
- founded a company called “Pixo”, focused on developing mobile devices





# Buxton's Key-points to note about the **life of the iPod**

source: [1]

Key-points to note about the life of the iPod:

## **1.) It took three years for the iPod to become an “overnight success”**

In fact it took even longer, since the time starts when the product was launched, not when the project began.

source: [1]

Key-points to note about the life of the iPod:

## **2.) The iPod was not the first product in this space.**

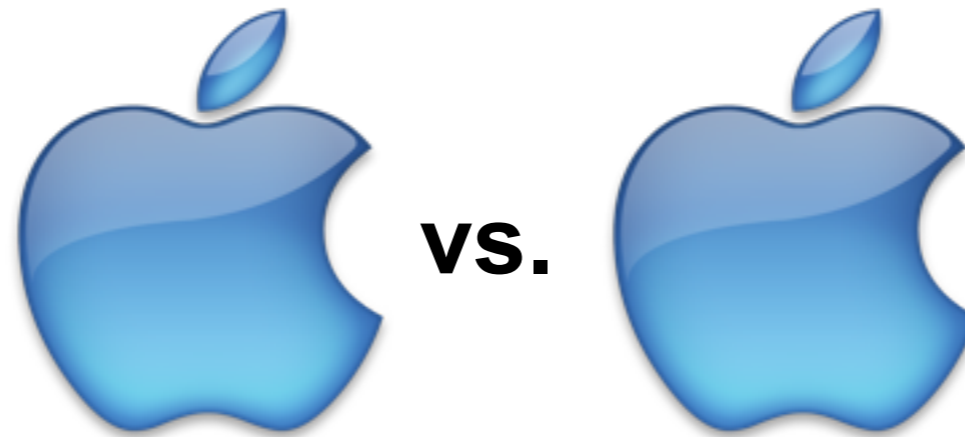
The first portable MP3 player, the *Eiger Labs MPMan F10* was introduced in the US in the summer of 1998, and was soon followed by the better-known *Diamond Rio PMP300*. Other hard-disk based devices also preceded the iPod, including the *Nomad*, released by *Creative Labs* in 2000.

source: [1]

Key-points to note about the life of the iPod:

### **3.) Apple was its own strongest competitor.**

Even though they were not first to offer a disk-based MP-3 player, once they entered the market, their pace of introducing new products and services left little space for competitors to grab market share.



source: [1]

Key-points to note about the life of the iPod:

## 4.) Apple arguably had the best-designed product, but that is a relative thing.

The iPod gets a lot of press due to its design and especially its usability. It is important to recognize that this is a relative thing. Despite the positive press, even the current model has serious usability problems. It is just the competition does too. There has always been, and likely always will be, significant room for improvement.



Key-points to note about the life of the iPod:

## 5.) **Style and fashion are really important.**

This is obvious to people from consumer products or haute couture. But it is not so well appreciated in the high-tech sector. What is especially worth noting is how the appeal of styling can be used to overshadow a product's weaknesses. For example, each generation of the iPod had its design problems, but these were more than compensated for by the iPod's strengths as a fashion item. The designer Jonas Löwgren calls this the **iPod's "jewelry aspect."** The thing to bear in mind in learning too hard on this aspect of design is that fashion can be very fickle, and can cut both ways.

source: [1]



Key-points to note about the life of the iPod:

## 6.) It took four generations of the basic iPod before it “tipped”.



**1st Generation**



**2nd Generation**



**3rd Generation**



**4th Generation**

source: [1]

Key-points to note about the life of the iPod:

## **6.) It took four generations of the basic iPod before it “tipped”.**

Apple itself made repeated and significant improvements to their product. Their changes affected most iconic aspects of the iPod's design, namely the user interface and the scroll wheel. The first and fourth generation are clearly from the same family, but by comparison to today's model, the first one feels almost clunky and coarse - a very different sensation than what it provoked when it first came out

source: [1]

Key-points to note about the life of the iPod:

## 7.) The success of the iPod depended on a much larger ecosystem.

The saturation ad campaign featuring black silhouettes on pastel backgrounds was just one example on how creativity of the marketing has to match the product. Likewise, a critical part of Apple's success was in their parallel initiative with iTunes and the associated music store.



Key-points to note about the life of the iPod:

## 8.) Jobs turned the Gillette model on its head

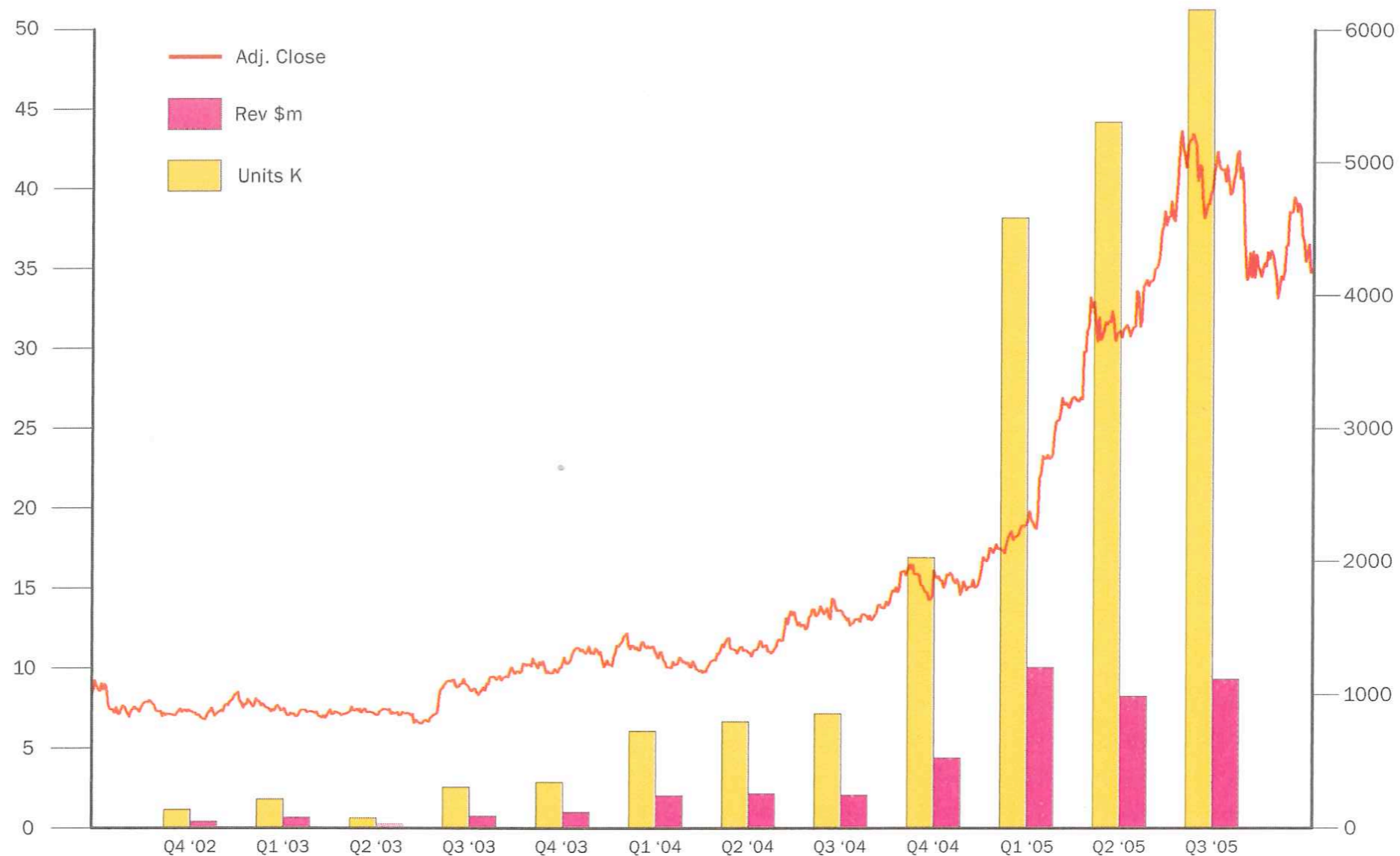
Gillette sells razors at loss on order to make money on the blades. Xerox made a major part of its income from the paper and toner consumed by their copiers. Apple has managed to do the opposite. They built their business around making their margin on the “razor” (The player) and accessories, and then selling the “blades” (The music) at the minimum that they could.



source: [1]

Key-points to note about the life of the iPod:

## 9.) Growth in revenue does not keep pace with growth in sales.



source: [1]

Key-points to note about the life of the iPod:

## 10.) There was some luck involved in Apple's success

It was not until the second-generation iPod had been released that Napster was finally forced to close its doors. Apple might have hoped, or even guessed, that this would happen. But they could not be sure. They were lucky.



Key-points to note about the life of the iPod:

## **11.) Even Steve Jobs had no idea how successful the iPod would be.**

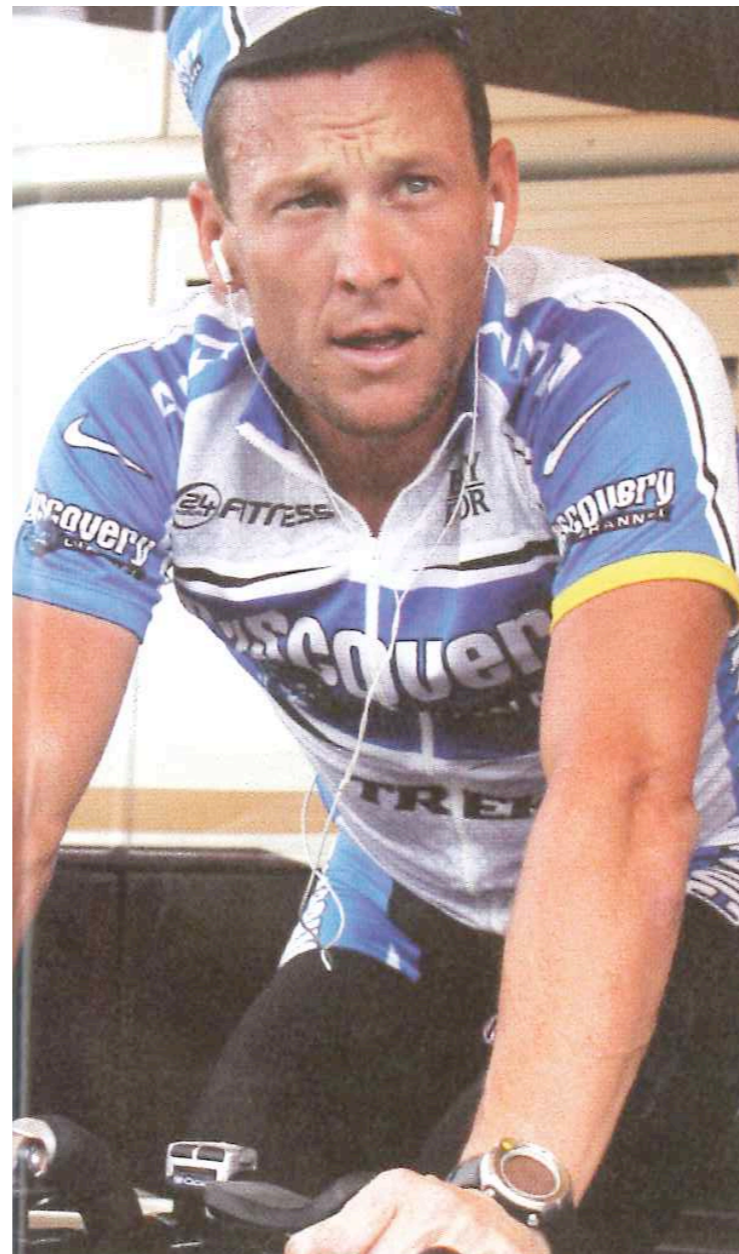
Steve Jobs hopes that every product that he brings out, including the Power Mac G4 Cube, will have this kind of success. And in planning, he anticipates what will need to be done in the event that it does. But by the same token, he knows that batting 100% is really unlikely. He hopes for it. He anticipates it. But he doesn't expect it or take it for granted.

source: [1]

Key-points to note about the life of the iPod:

## 12.) **God is in the details.** **(Ludwig Mies van der Rohe)**

One detail of the iPod design that illustrates the power and importance of simple details....



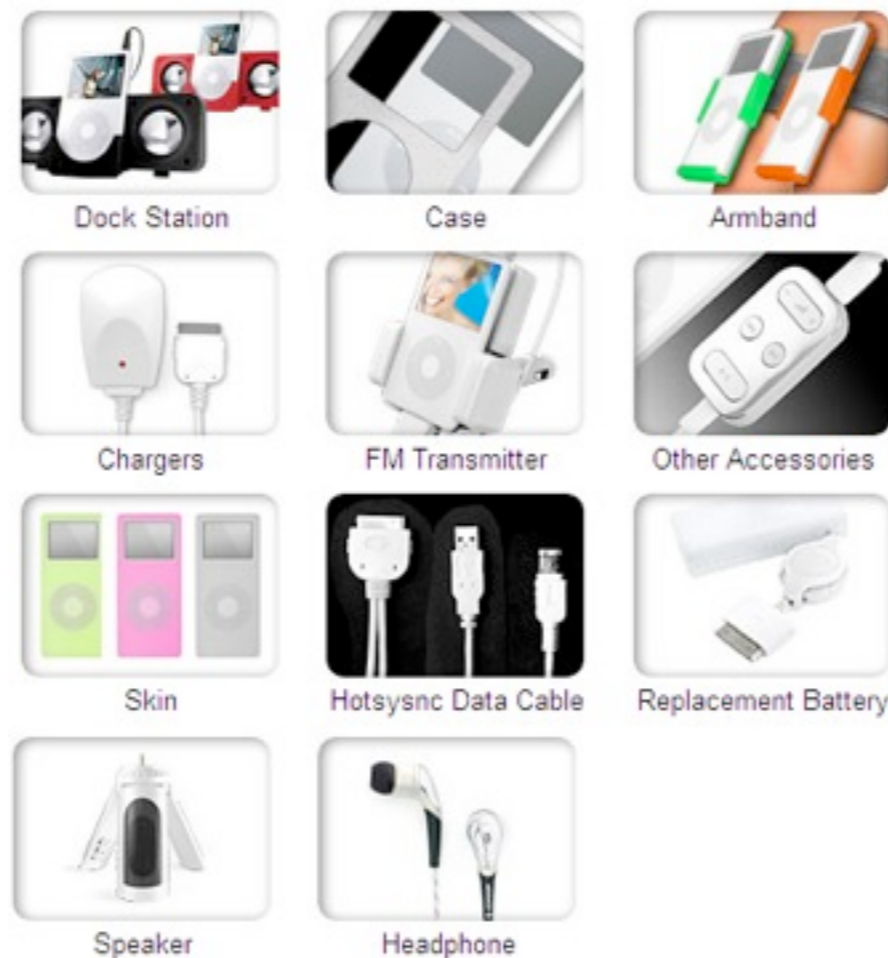
source: [1]



Key-points to note about the life of the iPod:

## 13.) Holistic design not only requires an ecosystem, it also feeds one.

Apple made as close as much money (or even more selling) iPods accessories as it does selling iPods themselves. The investment in the design sells the design. Marketing can leverage great design.



source: [1]

Key-points to note about the life of the iPod:

## **14.) From the design and management perspective, the iPod is a different class of product than the iMac.**

The previously mentioned development strategy (separation between the software and hardware design teams) does not apply here anymore.

There should not be a separation between the software aspects done by the user interface design, and the hardware aspects done by the industrial design.

source: [1]



# What can we learn here ?

Summary of one story on successful interaction design:

The company had to fire on all cylinders, with all parts going more or less in the same direction. There are always some superstars among the protagonists but...

**...everyone is essential, but no person or group is sufficient on his or her own!**

source: [1]

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