Name_____Period_____

CRITERIA & CONSTRAINTS

CRITERIA VS. CONSTRAINTS

Criteria include a listing of the **features** of a device or system; constraints deal with the **limits** of a design. Criteria and constraints often compete with each other.

GOOGLE GLASS

Consider Google Glass. One **criterion** that must be considered for a wearable computer is that you should be able to control the device using only your eyes. This includes taking pictures and video, as well as updating your status on Twitter and FB. One **constraint** that must be considered is that the glasses should be lightweight and small. Thus, we have a conflict between making the device as small as possible, yet wanting to be able to do tasks that would normally only be found on a device that is much bigger. Based on existing technologies, only so much computing power can be crammed into a small area, thus there is a limit on how much the device can do.

ROCK BAND DRUM KIT

Consider another example: the Rock Band / Guitar Hero drum kits. One **criterion** for the drums is that they should feel similar to real drums when the user hits them with a drum stick; i.e. they must provide a bounce similar to the head of a real drum. One **constraint** for the drums is that they must not be as loud as a real drum set, because we don't want angry neighbors knocking down their doors because of the noise! The criterion and constraint conflict with each other. When you "hit" a real drum head, it is too loud, but we still want our kit to feel "real."

CATEGORIES OF CRITERIA & CONSTRAINTS

Criteria and constraints can be grouped into the following general categories: technical/engineering, production, marketing, financial, and environmental.

TECHNICAL OR ENGINEERING

Technical or engineering criteria and constraints describe the safety characteristics that the device or system must meet. These criteria and constraints are based on how, where, and who will be using the device. One technical criterion of Google Glass is the ability to stream music to an external stereo through a wireless Blue Tooth connection. Another criterion is the ability for the battery to last for several hours to support reasonable use without requiring the battery be recharged. Also Google Glass must be configured to easily connect with the Internet.

PRODUCTION

Production criteria and constraints describe the resources available for producing the device or system. These criteria and constraints are based on the natural, human, and machine resources available for the production of the device or system. A production constraint for Google Glass might include that it must be manufactured using the memory chip and other components that Google already has available to it. Another production constraint might be that the Google glass must be able to be manufactured by the equipment Google currently has in its factories.

MARKET

Market criteria and constraints identify the function, appearance, and value of the device. These criteria and constraints are found by studying what consumers expect from the device.The public will expect that "Intelligent" glasses will have "touchless" control yet be extremely thin and lightweight.

FINANCIAL

Financial criteria and constraints establish the costs and benefits for the device or system. These criteria and constraints address the amount of money required to develop, produce, and use the technological device or system and the ultimate benefits from its use. A financial constraint for developing Google Glass might be that it must be priced competitively with other similar products. Also, the price of the Google Glass for consumers must still be high enough that Google makes a profit (is able to cover the cost of materials that go into the glasses, machinery used to make it, and the salary of engineers involved in designing it and technicians involved in its assembly and still make money).

ENVIRONMENTAL

Environmental criteria and constraints indicate the impacts of a device or system on people, society, and the environment. Here is an example from Google's website. "We're greening our company by using resources efficiently and supporting renewable power. That means when you use Google products, you're being better to the environment." (http://www.google.com/green/)

Questions:

1. Why is considering features/criteria and constraints an important first step in the design process?

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2. What are three criteria and three constraints that you need to consider when designing your mousetrap car to produce the maximum velocity possible?

Criteria/Feature	Constraints
1.	
2.	
3.	