CHECKSHEET FOR INITIALS ASSIGNMENT (HW6)

NAME: ____________________  SECTION #: 02

Part A. Pre-CAD Plan
✓ Identification/description of basic shapes
✓ Consideration of dimensions (attempting to minimize these)
✓ Consideration of supporting relations
✓ Selection of sketch plane and positioning of origin
✓ Initial thoughts about reference geometry
✓ Ordered list of feature creation steps and assumptions (if any)

Above and Beyond (Exemplary)
✓ Exceptional organization and neatness
✓ Analysis of steps/features that could prove difficult
__ Other: ____________________

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Part B. Process Documentation
✓ Rationale for usage of sketch tools
✓ Clear visualization of relations
✓ Thoughtful use of reference geometry
✓ Details on implementation of SW features
✓ Annotated design tree and completed part properties custom tab
✓ Compelling lessons learned

Above and Beyond (Exemplary)
✓ Exceptional organization and neatness
✓ Sketches appear to be “powerful” (easily resized due to dimensions and relations)
__ Other: ____________________

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Part C. Products (based on finished model and drawing)
✓ Fully-defined sketches
✓ Sufficiently complex solid model
✓ Enhancements to appearance of solid model
✓ Use of ME drawing template
✓ Multiple, non-redundant views in 3rd Angle orientation
✓ Thoughtful dimensioning scheme

Above and Beyond (Exemplary)
__ Exceptional organization and neatness
✓ Creative/complex design
__ Other: ____________________

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ME 301 INITIALS ASSIGNMENT

Draw your initials in the top plane using minimum dimensions and maximum relations. This should be a ‘powerful’ sketch that can be easily rescaled. Properly use the origin and define your sketch without using "fix". Next, make your initials "cool and 3D" using feature tools like extrude, shell, fillet, chamfer, etc. Add personal touches like shading, texture, color, etc.

Turn in the following pre-CAD plan:

design layout sketch/notes (2-D hand drawing with construction lines, basic shapes, origin selection, basic dimensions, planned use of relations to create fully defined sketches, simplifying assumptions, and general plan of attack)

Turn in the following process documentation:

design journal (including sketches with relations and dimensions, discussion of your use of sketch tools, development of your extruded final product, annotated design tree, completed part file properties summary and custom tabs, and at least three lessons learned through the assignment). Capture and comment on your work at intermediate stages of development. Note: completed part properties should include Author in the Summary tab, and Quantity, PartNo, Material, and Description in the Custom tab.

Turn in the following products:

fully-defined sketch of your initials before extrusion.

solid model showing details of your finished product in the display window. Use color printing for a more impactful presentation.

engineering drawing of your finished product (including shaded isometric view, non-redundant orthographic views, part properties, necessary and non-redundant dimensional annotations). Use the ME drawing template (3rd angle orientation and data exchanged between the part and drawing using part property information).
My initials are going to make up of mostly rectangles and triangles. I attempted to arrange these in a way that looked cool. After looking at it it kind of looks like a rocket.

My relations in this part will be pretty straight forward. I plan to align the bottom of my letters with the horizontal axis of the front plane. Then all the letters will be the same height. The relations between the lines will be pretty straight forwards too. I will use a lot of vertical, horizontal, and parallel relations to keep my lines in order.

In creating this I will use lots of lines. It will be a meticulous process to get all the lengths and angles correct. But after getting my three letters drawn all I will have to do is extrude them. The toughest part will be the E.

If this takes less time than I think it will, I might add a few more details to make it look more like a rocket.
For my initials I decided to make them look like a rocket. I still don’t have very much experience with SolidWorks so I wanted to keep it somewhat simple compared to some of the other projects I saw. I wanted to focus on using more relations and less dimensions rather than making a very complex part.

I started by sketching the G. I used a variety of different orientations of the line tool including angle, horizontal, vertical, and as sketched. Following my pre-CAD plan, using the line tool was definitely my best option because all my sketches will be made up of straight lines.

Starting with my bottom left corner on the origin of the front plane, I used lots of vertical, horizontal, parallel, and equal relations to help reduce the amount of dimensions I needed to use but still keep the sketch fully defined.

After I finished the G I moved on to the D. This sketch was a little more difficult because of the angled lines. At first I struggled to get this sketch fully defined because instead of using smart dimensions to set dimensions I was just changing the value in Line Properties\Parameters. I didn’t realize at first that this was changing the lengths of my other lines rather than extending or shrinking the line in the preferred direction.

At one point I just deleted everything and started over because everything was off by a little bit and nothing was lining up how it should (*CRINGE*). I really noticed this when I started adding relations because in some cases the certain relation I was trying to add was not possible.

Sometimes that is bad!

Starting over clean I did it right with smart dimensions and added relations as I went and it went much smoother and quicker.

I used quite a bit of parallel relations in this sketch because of the angled pieces are all at the same angle. Also I used the line tool throughout this sketch because straight lines.
I saved the most difficult letter for the last letter. This sketch was full of many small lines but considering it is symmetric about the horizontal axis, I was able to use lots of equal relations. And I kept most of the angled lines are at the same angle so I could use parallel relations as well. These helped keep my sketch in line with its self.

Throughout this sketch I found that using reference construction lines was very useful for getting all of my lines to match up especially because it was a symmetric shape. After the sketch was fully defined I was able to remove a lot of the reference geometry lines.

This sketch was difficult for me to keep down the dimensions down and keep it fully defined. I wasn’t sure what other relations to add that would allow me to remove more dimensions.

Really Good Use of Relations!

The last sketch I made is supposed to look like the back of a rocket to help make my initials look more like a rocket.

This sketch was made by using the same techniques used in making the previous 3 sketches. It helped to start my G on the origin because then I was able to relate all my other sketches off of it and the origin.
After I had all four of my sketches made and all fully defined, I was finally ready to extrude each sketch to the chosen depth of 8mm. Then my part size and shape was complete and all I had to do was add cool appearances to my part, add summary information, and create a corresponding drawing.

I made my part material be carbon fiber and added gold to the front face of each letter to help them stand out. Also I made the back rocket part red. All in all it looks a lot cooler than I anticipated it would.

My engineering drawing was basically impossible to show all the dimensions of because each letter had quite a bit of dimensions and relations and I didn't want to fill the whole drawing up with dimensions. So I tried to get some of the important dimensions on there but also tried to keep it clean enough so that you could actually see the part.

Summary Information
Summary Custom Configuration Specific

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Final Design Tree

- History
- Sensors
- Annotations
- Solid Bodies(4)
  - Hexcel AS4C (3000 Filaments)
    - Front Plane
    - Top Plane
    - Right Plane
  - Origin
- Boss-Extrude G
  - G
- Boss-Extrude D
  - D
- Boss-Extrude B
  - B
- Boss-Extrude Rocket
  - Rocket End
Lessons Learned

1. **Always** use smart dimensions instead of changing the value of in line properties.
2. Using construction line can be very useful and save lots of time. After this assignment I will be using them much more often.
3. Adding relations as you draw your sketch can really help make everything line up easier, especially if you are following a pre-CAD plan and you already know that certain lines will have relations. Also going back and adding them later is much more of a pain because it will keep saying everything is over defined.
4. There is a crazy amount of materials/colors of stuff that can make your parts look really cool.