
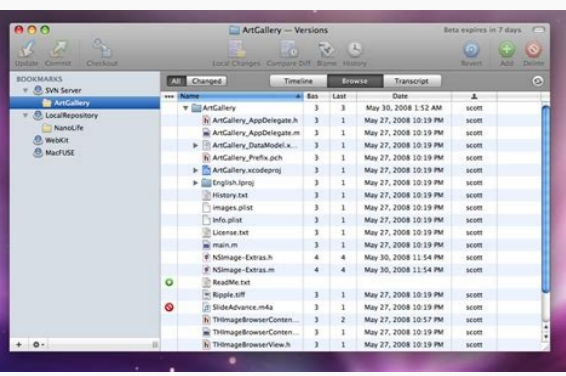


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## BYTE Interview

**Rosing:** The interesting thing is that we were at the stage in the program where the decision to make even what sounds like a simple change takes six months to percolate through because it's not a simple engineering change—it's manufacturing, tooling, documentation.

**Daniels:** We made one legend change in June or July—the Apple key. When was that?

**Testler:** July, and it's just now showing up.

**BYTE:** A legend change?

**Testler:** You saw two keys that said Command on them. The new version has only one, and instead of saying Command it has a picture of an apple on it. The reason is that the key's used as a shortcut to choose a menu command. If you look at a menu, on the right you'll see this little apple symbol

and a letter. If you hold down the Apple key and the letter, you get the command. We couldn't find any way to symbolize the Command key that would fit nicely in a menu and be recognizable to people. We tried and tried. Finally we decided that the apple looked nice and had a nice sound to it—"Apple X," "Apple R"—and it keeps Apple in the mind of the user instead of "control" or something else. It's a symbol that everybody using this machine will recognize instantly, so we decided to put it on the key as well as on the screen. To finish the artwork in time to get the machines to test users in time to get responses, and so on, the change had to be in by a certain date. The decision was made only hours before the deadline.

**BYTE:** Are there going to be two Command keys without legends on them?

**Testler:** No, only one. We studied IBM and DEC and other keyboards and found that they all have just a single Command or Control key on the left-hand side. We also really wanted to put an Enter key on the main keyboard because we would like to be able to offer a configuration in which an alphabetic keyboard and a numeric keyboard are independent—for, say, a company that does only word processing. Word processors don't need the Clear function, but they do need the Enter function, so we wanted to be able to have the Enter key on the main keyboard; that way, even people without a numeric keypad can hit Enter. Again, on IBM and DEC keyboards the Enter key is standard; on many of those keyboards, that's the standard position for the Enter key. So we decided to be more like other companies. The Enter key also gives us the option of removing the numeric keypad without losing an important function. And then the option keys were put on the side of those, and there we decided we did need two option keys, left and right, because they're used very much like shift keys for typing, and in Europe it would be very important to be able to touch-type for-

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Circle 200 on inquiry card.



The connector obstacle lets us define where bolts and screws would go. With this particular design, this is the only obstacle geometry that would be required. Generative Design Results The number of potential design solutions you receive will depend on the number of materials and other requirements you define. I'll leave all of the other settings the same, and I'll generate study #2 so we can compare the results with the first study. Watch what happens as I switch back to the design workspace. For manufacturing, I'm going to keep unrestricted checked. I wanted to create a tutorial that was more practical in terms of how a hobbyist may utilize Generative Design, especially since my first tutorial was more focused on a mass-produced part. We can now hide the preserved bodies so we can select all of the remaining bodies to be applied as obstacle geometry. Last but not least, I want to give a shoutout to all the new Patrons and the supporters who have bought me a coffee over the last few weeks. The bottom of our chair legs will be touching the ground, so we'll need to apply fixed constraints to all four of them. Before clicking "OK," we'll also want to turn on the "Tool Clearance" option. In some instances, making a part as light as possible can have a big effect on performance. This will let you extend the body out from the bolt or screw head, to define the clearance required to tighten the screws. The design solutions are based on the manufacturing settings you define. Obstacle Geometry For the shelf study, I created a bunch of obstacle geometry bodies. Notice how the geometry is created with T-spines. With our chair, we're going to have weight placed down on the seat as well as some weight or force towards the backrest. While the program is processing the designs of this first study, I'm going to hit the "Finish Explore" button and I'm going to clone the study, so we can run a second without the obstacle underneath the chair. I'll make the length of the tool clearance 200mm before clicking "OK". Notice how this automatically fills the shaft diameter and shaft length to their respective values. To do this, I'll create a new sketch on the back surface. To do this, we'll need to hide the obstacle geometry and turn the preserved geometry back on. Keep an eye out in early 2020, as it's expected that Autodesk will release the Generative Design workspace to all students with an Education license. Our shelf bracket would also have additional forces pushing towards the wall. If there's one thing that you take away from this tutorial it's the fact that the more you tell the program the more predictable your results will be. Enroll in the Specialization here: Looking for Autodesk Fusion 360 certification prep courses? On the other hand, some provided a unique solution that minimizes the amount of plastic or material used. Remember, the more you tell the algorithm, the more likely it is to produce satisfactory results. I'll look at the bottom of the chairs, you'll see that defining just that one body underneath the seat made a huge difference in the outcomes. The outcomes can be manufactured, including a 3D printable shelf bracket (that looks interesting). We'll first need to preserve all of these parts so they're included in the results. Preserve Geometry I started with the bare minimum to generate shelf designs. Complete the Autodesk Generative Design for Manufacturing Specialization, and you'll unlock an additional Autodesk Credential as further recognition of your success! The Autodesk Credential comes with a digital badge and certificate, which you can add to your resume and share on social media platforms like LinkedIn, Facebook, and Twitter. With lots of features and thorough review, we present a book to help professionals as well as beginners in creating some of the most complex solid models. Define the axis type by selecting 2.5-axis, 3-axis, 5-axis, or a combination of the three. 2-axis Cutting - Define the cut direction Die Casting - (currently in preview or beta mode) used to simulate die-casting metals. As always, I truly appreciate you taking the time to watch this tutorial. Special thanks to the new Patrons... BC Designs, Andrew Burda, Brian Ingram, and Dennis Johnson Also, thanks to those who supported the channel via my Buy Me a Coffee page... Dennis Murphey, The Modifier, Michal D. Steakbroetchen, J. Bonn, @AIK162, Geoff, and Anonymous. After running this first study, we'll clone it and I'll remove this body so we can see how different the outcomes can be by creating only one extra body. Generative Design Chair What if you could let the computer design the chair for you? For the sake of simplicity, I'm going to leave the tool properties as the default values. The difference is that anything created in the edit model space, will not appear when you're back in the design workspace. This will let me create an extrusion that runs from the bottom of the seat to the bottom of the chair legs, by using the "to object" extent type. The outcomes would also be quite a bit different from plastic or other materials that aren't as strong as metals. Our study number 1 is then automatically created. In this video, I'm going to show you a few more tricks as we take a look at using Generative Design with a chair and a shelf bracket. I'll just extrude this out to an arbitrary number and then I'll click "OK". For the materials, I'll add ABS Plastic and the general "plastic" option to the materials list. I'll also up the minimum thickness of additive to be 5mm. It's crucial that this is a separate body so we can turn this body into obstacle geometry. Creating obstacle geometry of bodies is not required. Keep in mind that for every material you add that's going to generate more outcomes per all of your other requirements. I only set up the minimum requirements for generating a chair, so we'll still need to create the obstacle geometry. Almost each chapter of the book has tutorials that are real world projects. This edition of the book, includes latest topics on Sketching, 3D Part Designing, Assembly Design, Sculpting, Mesh Design, CAM, Simulation, Sheetmetal, 3D printing, Manufacturing, and many other topics. The Obstacle geometry represents any areas that the computer algorithm shouldn't use when coming up with design solutions. This is the starting point for all Generative Design projects. If you have "obstacle geometry" you'll want to deselect them or hide them before doing this. I've gone ahead and cut out the wait time for the shelf brackets so we can take a look at those results. Now that I've created all of the bodies to be used as obstacles, I'll select the "Finish Edit Model" button. Define the overhang and minimum thickness. Milling - used for any time of milling or CNC process. You can also use the modeling tools to further develop or tweak your design as needed. You will be able to preview the solutions while they are still processing. You need to define where the dots are placed, and the computer will output as many solutions possible based on the defined requirements. In this book, we have tried to give real-world examples with real challenges in designing. Remember that we also ran two studies, the first which restricted how the legs attached to the seat, and the second, which gave the program free range to use the space under the seat. I'll first select the top of the seat. In this course, we'll explore how generative design can be applied to motorcycle parts to help reduce mass while also increasing performance. You'll need a paid subscription to Fusion 360 to complete the assignments in this course. One of the easiest ways to think about the structural constraint is to think about what part of the model will touch something while it's in use. Some of the salient features of this book are: In-Depth explanation of concepts Every new topic of this book starts with the explanation of the basic concepts. This will let me use the geometry to create straight lines, on each side of the bracket. The key thing with the extrusion is that you'll want to make sure your operation is set to "new body" so this doesn't join the seat body. You'll see that you are also given the options to define the diameter and length of the head, as well as the ability to flip the bolt head to the other side or to add it to both sides. Generally, I would recommend that you pick no more than 2 or 3 materials per each study, or it's going to take a long time for everything to process. If you have found my tutorials to be helpful in any way then consider supporting my content by becoming a Patron or by making a one-time donation on my "Buy me a Coffee" page. I'll type out 3200 ounces or 200lbs of force. The book follows a step by step methodology. The book is updated on Autodesk Fusion 360 Ultimate, Student V 2.0.10027. Again, I'll make sure that this is a "new body," so we can differentiate this body from the preserved bodies. I'm also going to add the fixed structural constraints where the shelf would need to be attached to the wall. What this obstacle geometry would do is tell the algorithm that the legs of the chair must be defined around this space, and they can only attach to the bottom of the seat where the open areas remain. Just keep this in mind, as you'll see little things like this will start to add up and affect the outcomes of your designs. I'm also going to stainless steel and steel to the top of the material's list. In Fusion 360 you can choose between the following manufacturing settings: Unrestricted - doesn't take manufacturing into account Additive - used for 3D Printing and other additive methods. Obstacle Geometry After defining the preserve bodies, you'll want to define the obstacle geometry. Check out this plastic shelf bracket that was created in Fusion 360's Generative Design workspace. I also have the straight pieces where the shelf would sit, with an additional hole to secure the shelf to the bracket. Minimizing mass is also better for our environment on many accounts - shipping, raw materials, etc. One thing to point out, I should've put a "connector obstacle" on the top hole, as it appears it was filled in on most results. For this one, I'll change to create a sketch on the bottom of the chair legs. The obstacle geometry below the chair's seat is not required. There are many considerations and factors that play a part in designing a new product. You can see the two holes and parts of the bracket that would be required to attach this to a wall. You can then select the outcome what the outcome may be with 3-axis vs 5-axis. Lastly, we will want to define our materials for the chair study. We would also need to create the same "Connector Obstacle" for the hole on the top of the bracket, so we can secure the shelf to the bracket. To satisfy the minimum requirements of generative design I've defined the backrest of the chair, the seat of the chair, and the starting point on all four legs. Generative Design Workspace The Generative Design workspace is normally only available to those using a commercial (paid) Fusion 360 license. Many people have this false perception that you simply tell the program to create a chair and it will come up with thousands of ideas. I'm going to enter the Generative Design workspace by selecting it from the workspaces dropdown. Don't hesitate to comment your questions below! Transcript: Hey there, it's Kevin Kennedy and welcome to another Generative Design video. So this is a great way to set up obstacle geometry as you work on creating your Generative Design study. For the design objectives, we want to double-check that our setting is on the default of minimizing mass, which will tell the algorithm to use the least amount of material possible while fulfilling all of the other requirements. If we didn't select them we could define them by simply typing out or desired value. The most important thing with this chair would be for us to block out the entire area above the seat, which will tell the algorithm that it can not use that space for any of the design solutions. Check out additional learning resources to help you uplevel your skills: The Autodesk Fusion 360 Black Book (V 2.0.10027) is 4th edition of our series on Autodesk Fusion 360. However, until January 1, 2020, anyone with the Hobbyist or "Personal Use" license type can access and run generative design studies absolutely free. At this point, we've defined the spots that are required to make sure this shelf bracket remains functional. You'll see that we first have to select the "Start of Shaft". For example, notice I blocked out the entire area above the chair's seat (picture below). Lastly, I'm going to create a sketch on the bottom of the chair legs. The obstacle geometry below the chair's seat is not required. There are many considerations and factors that play a part in designing a new product. You can see the two holes and parts of the bracket that would be required to attach this to a wall. You can then select the Outcome Geometry button in the toolbar, and notice how the 3 bodies are selected so all we have to do is click "OK" or hit the enter key on our keyboard. For the manufacturing settings, I'll leave unrestricted checked and I'll make sure additive is checked, but nothing else. The very last area that we would need to clear would be the screw holes for the bracket. This was simply a way of me telling the program that I only want the chair legs to be defined and attached to the outer area of the seat. Cost is usually a big one, but sometimes there are other factors that are the main contributors to a product's direction. Preserve Geometry I preserved the backrest, seat, and four legs (feet) of the chair. I'll also leave the default of aluminum to see how different that comes out in comparison to the plastics. Shelf Generative Design Solutions Many of the shelf designs were nothing special. While the shelf brackets are processing, let's take a look at some of the Chair results. Generative Design in Fusion 360 uses computer algorithms to output potential design ideas based on manufacturing, materials, stress, and other requirements. Final Generative Design Chair Results can be exported back to the Design workspace. Therefore, I'll create a sketch on top of that. Similar to the chair design, it appears that some of the results didn't come out so well. This means you can edit the geometry in the Form (Sculpt) workspace. I'll simply offset the bottom perimeter of the underside of the seat. Remember that generative design is not just about saving money in the manufacturing process. I'm going to create a sketch off the back of the bracket, where it's attached to the wall. The "Pre-check" button now has a green checkmark, which means we're ready to run the study, and we don't have any concerns. But note that you would need to fill out the values of your machine's tool. We can now extrude each rectangle, essentially creating walls on the side of the bracket, to tell the program that we want the design solutions to remain completely within this void. Generative design allows us the ability to solve for both problems at the same time and make informed design decisions without the sacrifice. The book covers almost all the information required by a learner to master the Autodesk Fusion 360. Notice how I also added screw holes. I'll also change the units to ounces, so it's easier to imagine the amount of force. Next, we can create the bolt or screw head, by turning that selection on. There are about 2200 small and large illustrations that make the learning process effective. Tutorial point of view! At the end of concept's explanation, the tutorial make the understanding of users firm and long lasting. Ultimately, the more you can tell the program the more likely it is to produce a satisfactory result. All of the contributions help me keep the website up and running and will help me continue to create high-quality tutorials. I've gone ahead and set up the minimum requirements of a simple shelf bracket. Notice in the image below how I blocked around the entire object, forcing the algorithm to create solutions within the standard width of the shelf bracket. We then need to define the structural loads or forces applied to the object. Let's compare one of the designs from each study. On the other hand, some of them look pretty interesting, and could definitely be 3D printed. Be sure to review your access or payment options before enrolling: Want to take your learning to the next level? Define the ejection direction, draft angle, and minimum and maximum thickness. Once the obstacle geometry is defined we'll need to define the structural loads of the bracket. Notice the filter options on the left-hand side. This ensures the seat is usable by telling the program that the design cannot obstruct that area. I'm curious what you guys think...so comment below the location and amount of forces that you think a standard shelf bracket would have. For the end of the shaft, we would need to select the circle on the top side. We can leave the default of aluminum. At first glance, it appears that about half the designs came out very interesting, while the other half are essentially big blobs or blocks of steel. With vehicles, specifically motorcycles, we see advanced engineering practices performed on seemingly minor parts. In this way, the user can easily find the topic of his/her interest easily. Instruction through illustration! The instructions to perform any action are provided by maximum number of illustrations so that the user can perform the actions discussed in the book easily and effectively. Remember, that was me defining the dots for the program to use. To further define the chair's geometry we may consider adding another obstacle body below the seat. This will make sure we have a smooth surface to attach the bracket to a wall. For this tutorial, I'll simply add an additional

10lbs of force going at a 30-degree angle into the screws would close off this shape so I'm able to extrude the closed profile. After defining the minimum requirements - backrest, seat, and the four legs (feet) - generative design can be used to generate potential design solutions. I'll hit "E" for extrude, and I'm going to extrude the entire surface up until its well over the back part of the bracket. However, it is currently only available to the 200 Autodesk partner schools. However, one of the core principles of generative design is understanding the more you tell the algorithm the more predictable the outcome will be. Click that thumbs up icon if you learned something in this video and be sure to click that playlist in the lower right-hand corner to watch more generative design tutorials. However, in almost all designs you'll want to define some areas as obstacles. In our case, we would want to drag this out to ensure there is enough room for a screwdriver or drill to screw this bracket into the wall stud. Intending this for 3D printed plastic, I'm going to add a force of only 160ounces or 10lbs. Similar to the chair design, we'll need to define obstacle boundaries after entering the generative design workspace. In this video, we'll take a look at creating a chair and a shelf bracket using Fusion 360's generative design workspace. To select all three of these bodies I'll hide the preserved bodies in the browser and I'll drag over them in the canvas window. We first need to apply a force pushing down on the shelf, where the weight of the books or objects would go. The book starts with sketching and ends at advanced topics like Manufacturing, Simulation, and Generative Design. This isn't a huge problem, as we could always add the hole after exporting the result. Then, I'm going to project the outer geometry as well as the top bracket geometry. Once again, I'll edit the model, to create obstacle boundaries that are only included when this design file is viewed in the Generative Design workspace. You'll see the obstacle bodies no longer appear since we created those in the Edit Model mode within the generative design workspace. I want to tell the program that no geometry can run past the bottom of these legs, which will ensure the chair remains flat on the ground. Moreover most of the tools in this book are discussed in the form of tutorials.ProjectProjects and exercises are provided to students for practicing.For FacultyIf you are a faculty member, then you can ask for video tutorials on any of the topic, exercise, tutorial, or concept.NewIf anything is added or enhanced in this edition which was not available in the previous editions, then it is displayed with a new symbol in table of content. Another area that we certainly do not want any geometry generated would be the top of the shelf bracket, where the actual shelf would sit. While the chair results are processing, let's set up a study for a common shelf bracket. I thought something as simple as a shelf bracket would be a great starter project for those of you that are into 3D printing. Then, I'm going to project the body geometry of the backrest, so I can create a profile shape that's the entire area of the seat, including some extra room for clearance. The Education (student) license also offers free generative design. In our case, this would be the circle at the start of the hole. In this way, the user becomes capable of relating the things with real world.Topics CoveredEvery chapter starts with a list of topics being covered in that chapter. You can use "Obstacle Connectors" to block out the screw and bolt holes. I'm then going to uncheck everything else except milling. If you right-click on a body you can select "Clone Study" which will copy everything over to Study #2. Sharing your Autodesk Credential can signal to hiring managers that you've got the right skills for the job and you're up on the latest industry trends like generative design. One trick while trying to preserve parts is that you can simply drag over all of your parts to quickly select them all. I'll use the marking-menu to repeat the structural loads command and this time I'll select the backrest body. Similar to the chair, we may also want to define additional obstacles, as a way to further predict the types of outcomes we should expect. Using Generative Design one can look at alternative designs based on manufacturing and material requirements. You can think of generative design as a game of connecting the dots. Once the materials are selected, we'll need to turn the obstacle bodies back on. I've gone ahead and set up the basic structure of a chair, as well as a shelf bracket. However, I should state that this is not my area of expertise. Once the materials are added, we simply need to turn the obstacle bodies back on and we're ready to run the study. We have tried to reduce the gap between educational use of Autodesk Fusion 360 and industrial use of Autodesk Fusion 360. In other cases, the strength or stiffness of a part, such as a motor mount, is more critical than its mass. If we want to keep the shelf's entire width defined by the top of the bracket, then we could create a box on both the left and right sides. First, I'm going to select both components so I can preserve them. Generative Design Shelf Bracket A shelf bracket comes in a handful of standard shapes. Looking back at the chair example, you can imagine how different the outcome would be if I had designed a different style backrest or shape of the seat. A new chapter of Generative Design has been added in this edition. To summarize this video, I want to clarify a common misconception with generative design. If you remember in the chair example, we did the same thing by creating a box below the bottom of the chair legs. Our force is likely going to come more from an angle than straight back, so we can use the rotation slider to add about 20 to 35 degrees to the force. I'll finish editing the model and let's turn these into obstacle geometries. I'll edit the Obstacle geometry and then I'll simply deselect the bottom body so we can generate results where the chair legs can intertwine or connect anywhere underneath the seat. I'm going to create a new sketch off the top of the seat. Back in the Generative Design workspace, the next requirement would be to add structural constraints. Instead of creating another block, we can use Fusion 360's built-in "connector obstacle," which is located in the toolbar. The computer, however, will not change the placement of the dots. You can use the filter options to narrow your design solutions to choose one that fits your requirements based on size, weight, volume, material, etc. If you haven't watched my first Generative Design tutorial then you'll want to check that out first, as I won't be covering all the basics of setting up the study. I'll then create a 2-point rectangle that encompasses the entire object, ensuring that nothing is generated behind the brackets. One thing that I didn't show in the last tutorial is the fact that we can create obstacle geometry using the "Edit Model" feature.

Free Options: D2L. This easy-to-use platform will make it simple to recreate websites with built-in tools, however, there is no full publicly-facing option available. Cascade An accessible, MSU-branded website that is primarily used for MSU unit websites. Making content publicly available requires hosting space such as the LAMP stack (see below). Download Free PDF. Download Free PDF. Machine Learning A Probabilistic Perspective. Hanmei Zhang. Download Download PDF. Full PDF Package Download Full PDF Package. This Paper: A short summary of this paper. 34 Full PDFs related to ... Mint, Sell, Trade and Explore NFT & FT on Cardano Blockchain. Get 24/7 customer support help when you place a homework help service order with us. We will guide you on how to place your essay help, proofreading and editing your draft - fixing the grammar, spelling, or formatting of your paper easily and cheaply. Join author Michelle Ruiz Keil for this generative online workshop using fairy and folk tales to inspire, structure, and enliven your work in any genre. Using a mix of familiar and obscure texts, writers will explore fairytale techniques such as rhythm, matter-of-factness, familiarity, and strangeness, generating new writing and discussing how these techniques can be used to ... Without official lessons, though, Hazel will need more than just her books—she'll need corpses to study. Lucky that she's made the acquaintance of someone who digs them up for a living. But Jack has his own problems: strange men have been seen skulking around cemeteries, his friends are disappearing off the streets, and the dreaded Roman Fever, which wiped out thousands a ... Free Unlimited Revisions. If you think we missed something, send your order for a free revision. You have 10 days to submit the order for review after you have received the final document. You can do this yourself after logging into your personal account or by contacting our support. Main Conference Schedule (April 12-14, 2022) April 12, 2022 (Tuesday) Timings Hall 1 Hall 2 Hall 3 Hall 4 Hall 5; 08.30-09.00: Inauguration (Hall 1) Lei Chen (Hong Kong University of Science and Technology, Hong Kong), P. J. Narayanan (IIIT Hyderabad, India), S. Sudarshan (IIT Bombay, India), Masaru Kitsuregawa (University of Tokyo, Japan), P. Krishna Reddy (IIIT Hyderabad, ...

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