This is the second of four optional modules, that share a demo edit of a student's work from a previous course. This second optional module is particularly interesting because it brought up a good conversation in that previous course about an issue that we're going to be talking about in this course as well, which is, plagiarism. It turned out that when I did the demo edit of this essay for the class, a couple of savvy students in the class noticed that the author of this essay had actually plagiarized a couple of lines, a couple of sentences from a press release that was written about this research. And it was actually a really good teaching moment, because we got into a discussion about what is plagiarism. It's not okay to just lift lines from something that other people have written. I just want to point it out, though, as you're watching this demo edit, so you watch out for those plagiarized instances, and also start thinking about how to avoid plagiarism in your own work. It's actually fairly interesting. When you hear me go through the demo at it a couple of times, I'll say something like, I really like this sentence, or I really like how the author put this I like this language. And it turns out that actually those are the instances that the other had plagiarized from the professional writer, from the press release. So I probably should have recognized that the style in those instances was actually different than the rest of the piece. I'll just give you a few examples before you watch this demo at it. The other wrote, antennas serve as electronic reins, injecting small charges into the roach's neural tissue. The charges trick the roach into thinking that the antennas are in contact with a physical barrier, which effectively steers them in the opposite direction. So all of that language was lifted from the press releases. There are some other smaller instances. Uses an electronic interface to remotely steer cockroaches, creates a mobile web of sensors. Or some other pieces of sentences that were also lifted. It's great teaching moment just to be aware of plagiarism, and we're going to be talking more about that and how to avoid that later in this course. So now pause the video, read through the paper one or two times, and then restart the video, and I'll walk you through the edit.

So now that you read through the paper, it's an interesting paper. It's got a cool concept. Here we're using cockroaches as biological robots, biorobots. So it's got a really nice hook on this paper as well. And I'm just going to go through and edit it again, looking for the overall structure, and also editing things line by line. So I'm going to go in and make a few edits here and there. I'm going to rearrange a few things. So one of the things you might have noticed is that the author has a lot of technical details about the device in the paper, and that's fine. They do a good job. I was able to understand everything, even though there were a lot of technical details. So it wasn't bothers him to have so many technical details. But I thought maybe we could reserve one paragraph for all of the technical details. So I'm going to move things around just a little bit to put all sort of the technical details about the device and a single paragraph.

So I'm not going to go through in there. There are a few places I might delete a few words here and there and move a few things around. So in general, it's reading really nicely. And these are just a few things to streamline it and kind of reorganize it just slightly so that the flow is just slightly better. So if I'm going to go through the first paragraph. So scientists are still looking for small size robots. There's a few words I can edit here. So scientists are looking, I don't think we need this, still are looking for and then we get small size robots. I actually think we don't need the word size. They're right, because small implies size. So we could just say, scientists are looking for small robots that can navigate in dynamic and unknown environments. And this is a really nice language, dynamic and unknown environments. That's really good language. And I'm actually going to add one little piece to that, because at the end of this paragraph, they get to this idea about survivors and earthquakes. And that's a nice little detail that really grounds the reader. You kind of see the how important this topic is. So I added just a little bit here. I added such as the aftermath of an earthquake. I got that little thought in early, and that means I'm going to be able to cut some material from the end of this paragraph. So it's just going to streamline things a little bit. This challenge inspired these researchers from North Carolina State University to use cockroaches as biobots. I didn't change much here. I just streamline this. Just like to turn cockroaches into biobots. Seemed like a slightly stronger verb than used. You could even probably come up with a better verb there to transform cockroaches, or something like that.

And then we get they developed a wireless biological interface that uses an electronic interface to remotely steer cockroaches. This is a little bit too worthy for the first paragraph, where you're really trying to, draw the reader in. And so I actually don't, think we need all of this biological interface. Electronic interface are kind of vague, and the reader, the author is going to give us this in the next paragraph later on. So I don't think we need all that. The best concept, the best wording from this sentence, is this idea of the remotely, steering the cockroaches. I thought if we could just take those couple of words, that would convey exactly what it is these researchers are trying to do. They're trying to remotely remote-control cockroaches. So I don't think we need these things about the interfaces yet. We can leave that for the next paragraph. Uh? But I'm going to start the next sentence with their remotely controlled cockroaches. So that gets the concept to run across really fast immediately. You know what we're talking about? We're talking about remote control cockroaches. We don't need to know it yet how it happens, but that's the idea to make remotely control cockroaches. And then I like this idea of a mobile web of sensors. That's a really nice way of putting it. So I'm going to kind of just start with their remotely control cockroaches and go right into that idea. So their remotely controlled cockroaches could, uh, someday, I think I'm going to put the word Sunday, because it's we're not there yet. This is the preliminary could someday serve as a mobile web of sensors, and we don't need to repeat that uses cockroaches. So we can get rid of that. A mobile web of sensors that collect and transmit data. And we've started to get the idea of earthquakes in our here, so I'm just going to say that collect and transmit data from hard to reach places, something like that. And actually that idea of the survivors of natural disasters, that's a really compelling detail. I'm going to leave that for the end of the piece so that we have something to end on. That kind of wraps it back to the beginning of the piece. So this shortens up the first paragraph just a little bit, so we get right into it. We don't get too much details, but we have a good picture in our mind of what the researchers were trying to achieve here.

Then we go into this second paragraph. Cockroaches have an antennas. I really appreciate, by the way, that this author made a good effort to use dashes and semicolons and colons. And so it's nice to see that they obviously watched the videos and thought carefully about it and tried to implement some of these punctuation techniques. So always folk feels great for a teacher to see somebody putting those things into action. I'm going to change a few things. So, like, instead of dashes here, I think probably this is a little extra detail, so I'm going to put it in parenthesis, rather than dashes, because maybe the reader doesn't care what the antennas are actually called. So cockroaches have antennas to sense. Um, I like that sense versus to sense. But, you know, that's that can sense. Um, these are all, that's a little stylistic. We actually probably don't need the colon here. I do again, appreciate that that they try to use a colon, but actually we can just go right into This is a very simple list. So the colons actually not needed there. So cockroaches have antennas called Crecy that can sense tactile, temperature and humidity. And the one thing I'll just point out there is that there's a little bit of non-parallelism here. So temperature and humidity are nouns. Tactile is actually an adjective. So we want to make that parallel by making this first item in the list announced. So I'm going to call it tactile input. And then we get researchers, and we might as well say the particular researchers here, so I'm just going to use their last names, so those two researchers Latif and Boozkurt by pronouncing that, right?, Um. And then we get used these antennas to drive the cockroaches by sending a series of electrical pulses to it. So I thought here it would be a good place to put in. Created the fact that they developed a device. So created a wireless device. So let's just say you're up from what they did. The bulk of what they did, the gist of it is they created a wireless device, uh, that attaches to these antennas. So let's get that concept early on to so it's easy for the reader to picture what's going on. So these are wireless devices that actually attach the antenna. So let's get that early in the piece, so that the reader is a very concrete picture of what's going on here. And can deliver small electrical pulses that drive the cockroach. So this is kind of a high level summary of what their device does. I like to put the, uh, the driving the electrical the electrical pulses drive the cockroach, rather than putting those concepts the other way around. So that's why I'm putting the electrical pulses before the driving. I think you just work slightly better there. So we now get kind of this high level summary. We get a wireless device that attaches to the antennas and can deliver electrical pulses that drive the cockroach. So that's really summarizing exactly what this device does. Then we're getting a lot of details about the system. I'm actually going to set that those details often make that into a new paragraph. So let's have one paragraph that has all of the technical details about the device. For this second paragraph, let's keep it to a high-level summary of exactly kind of what the device does. And I really like this sentence that they have down in this third paragraph. The charges trick the roach into thinking that the antennas are in contact with a physical barrier, which effectively steers them in the opposite direction. When I read that, I finally got exactly how this device works. So I thought that details really important that to have early on, because it really tells the reader exactly how this thing works. So I'm going to leave the second paragraph at just that. and is an easy to read summary so the reader can immediately picture how this thing works, then we can go into the actual details about the technical parts of the of the summary. So, uh, the system consists of, I like device. Let's talk just about the device for the moment. So the device consists of a microprocessor with ZigBee interface, electrodes and a battery. The user controls the microprocessor wirelessly using a ZigBee transceiver. I'm actually going to connect these two ideas so the device consists of this, and then the user controls the device with this, um ZigBee transceiver. I don't think we need to say wirelessly again, because we already said it was a wireless device, so we don't need to repeat ourselves. I'm going to end the sentence there the fact that the microprocessor sends electric pulses to the cockroaches, antenna using electrodes in the cockroach moves. Guess what? We've already said that in second paragraph, so we don't need any of them. So now we've talked about the device itself, the microprocessor, the transceiver the electrodes in the battery. And so now this is a good place, actually, to move up something that the author had here below the other talks about the particular microprocessor that was used in the device. So it seems to me that it would be perfect to discuss that right here. So I'm going to move that up from the third paragraph. So now, as long as we're talking about the device, let's talk about the microprocessor in the device. So the researchers evaluated, I'm going to change, evaluated to test it. I like that just slightly better to test it to microprocessors. I don't think we have to say that control the electrodes that's implied, so we can just go right into they. We know there's a microprocessor here that you want, they test it, and then they CC2530. Oh, was better because of these reasons. I'm guessing that means that they incorporated, that they tested two microprocessors, but they ended up using the CC2530. So let's say they incorporated the CC2530, in their final device, due to these factors,, in their final device, due to its low weight, its ZigBee module connectivity,, obviously that would be important if it has to connect with the ZigBee And then we get to and the availability of 21 general purpose io. I wasn't quite sure what that is. So I'm guessing here, I'm completely guessing here. And greater number of I-O parts. That wasn't exactly parallel, either I or ports, maybe. So I'm picturing, like, little electrodes here. So I'm not sure that I've got this quite right, so I'm going to highlight that so that the author can look at that and put it in a way that I can understand. I don't think we need to know the details about the battery, so I'm actually going to cut that detail. So they incorporated the CC2530 Trio in their final device due to its low weight, it's ZigBee module connectivity and the greater number of io ports, because they said there were 21. So I'm guessing a little bit, and hopefully I got that right, but if not, I'm highlighting it so the author, in their revision, can put something there that's similar, but um is accurate. If that isn't accurate.

So then we get to exactly what cockroaches the authors, you the researchers here, use. And so I'm going to just use their last name. Latif and Bozkurt used the Madagascar hissing cockroach. I don't think we need during their analysis, right? We just need to know that they used it. Used it because of, again, I appreciate the author using this, the colin, but we probably don't need the colon here, because it's a fairly simple list. So because of its larger size, so speed, long lifespan and robustness. And I like to have a comma the end of a list, so that all looks good. Before the experiment starts. They anesthetized, I think, um, , I just say we could get kind of collapse this into after anesthetizing, I spelled that right after an anesthetized the cockroach is by cold treatment. We can just go right into that for 45 to 60 min They need to anesthetize them before they attach the electrodes um. They attached one side of the lecture, so we can go right into that. So they anesthetized them. After they anesthetized them, then they attached one side of each, electrode. Maybe one side of the electrodes. I thought, maybe it's one side of each electrode. Again, I would double check that detail with the author, but it sounds a little better to say, once out of each electrode to the, antennas. And I really liked the wording here to serve as electronic rings. I thought that was a nice way of putting it. But in fact, we've already said that in this second paragraph, that it delivers these small charges to the rodents the roaches, rural tissue. So actually, I'm going to get rid of that. We just need to know that they, after they anesthetized these bugs, they attached the electrodes to the antennas. And we don't need to repeat again that it's delivering these small electrical pulses, although I like that visual of electronic rain. So if there was some way to work that back into maybe the second paragraph, I'd encourage the author to do that. That was some nice language.

Now we get in the next paragraph, we get to the actual test. So they made the device, and then they were testing the device on actual cockroaches. And this is one part where I want some more details. I want to know more about what happened when they actually tested the cockroaches. So I'm going to say, in tests of the system, I'm going to be very explicit and let the reader know, hey, this is So we developed the system, we also tested it. So in tests of the system, cockroaches followed an essay shaped trajectory drawn in laboratory floor and spent 81 s with 100 with 10% success rate to complete the route. Now, I'm wondering if that's an error. I'm going to push off this last parting thought as and make that into a new paragraph, because this test of the system really deserves its own paragraph. I wonder if that was supposed to be a hundred percent cent, a hundred percent success rate to complete the route, because if it's only a 10% success rate, I'm thinking that that's not very good. So I would highlight that and ask the author if that's maybe an error, and it was supposed to be 100 %, or if it's only 10% success rate? I'd like to know a little bit more about why they're still enthusiastic about this system, and we need a lot more details here. So what you know, what else did they test was that the only test they did. Give me some more details about exactly what happened, how promising the results were, because this is the proof of principle of the device. So we need a lot more details here about that part of the experiment, so I'd ask the author to add that in.

And then this last sentence, this will become the concluding paragraph. Will lead into the concluding paragraph. So this finding opens the door to scientists to start using insects and biobots um. And there's a little bit of grammatical error here in biobots I might just kind of cut it there. And then there's a new thought that the systems weed is still a problem. So this one I thought I needed a little bit more set up for because I'm not sure why the way to solve a problem, it seems like a cockroach is pretty small, they have a pretty small device. So why is the weight still a problem? So I feel like we need a little bit more detail about that. You could put that in this second last paragraph, or maybe start the last paragraph with This system is still too large. Because give me the why the system needs to be shrunk even further. So further research needs to reduce the way to the system. Because I need to know why, because I'm not sure why this isn't already small. And there may be a butt to transition if we're kind of saying that the negative and the drawback, and, you know, the challenge is, maybe need a butt there to transition to that final thought, that this is something still really cool, but this finding opens the door to scientists to start using insects as biobots, um, I would say, as biobots, rather than in biobots. And then you could end there. Maybe it's nice to add one last kind of parting thought here. So again, I mentioned that I cut out of that first paragraph the specific reference to the survivor of the earthquake. So maybe we could add something at the end to wrap back to the beginning. Someday, armies of cockroaches maybe the best hope for rescue for natural disaster survival survivors or something like that. Natural disaster So maybe something like that, you know, kind of get some hook back. someday. Armies of cockroaches, maybe the best hope rescue for natural disaster survivor. So turn it again, kind of rapid back to that first thought. Just gives it a nice ending to tie it back to the beginning.

So now I think it's reading really well. And as a nice set up, we've got a nice introduction that pulls you into the piece. We got an overview of this device without too many technical details. We get a nice paragraph that delivers all the information about the technical details. We get how they actually attach it to the cockroaches. And then, uh, we get some information about the first test of the system. That's where I'd like the author to add a little bit more information. And then we get kind of a parting thought and maybe some of the challenges that, remain.

这是四个可选模块中的第二个，它们共享学生在上一门课程中的作业的演示编辑。第二个可选模块特别有趣，因为它在之前的课程中引发了关于我们在本课程中也将要讨论的问题，即抄袭的精彩对话。事实证明，当我为全班编辑这篇文章时，班上有几个精明的学生注意到，这篇文章的作者实际上抄袭了关于这项研究的新闻稿中的几句话，几句话。这实际上是一个非常好的教学时刻，因为我们开始讨论什么是抄袭。仅仅从别人写的东西中删除台词是不行的。但是当你观看这个演示编辑时，我只想指出这一点，所以你要注意那些抄袭的实例。还要开始思考如何在自己的作品中避免抄袭。当你听到我完成演示编辑时，其实相当有趣，有几次我会说一些我真的很喜欢这句话，或者我真的很喜欢作者的说法，我喜欢这种语言。事实证明，实际上这些是作者从专业作家、新闻稿中抄袭的例子。因此，我可能应该意识到，在这些情况下，风格实际上与作品的其余部分不同。作者写道，在你观看这个演示编辑之前，举几个例子，天线充当电子控制器，向蟑螂的神经组织注入少量电荷。这些冲锋欺骗蟑螂以为天线与物理屏障接触，这实际上会将它们引向相反的方向。因此，所有这些措辞都从新闻稿中删除了。还有其他一些较小的例子，使用电子接口远程控制蟑螂，创建了一个由传感器组成的移动网络。还有其他一些句子也被解除了。只要意识到抄袭，现在就是很棒的教学时刻。在本课程的后面部分，我们将更多地讨论这个问题以及如何避免这种情况。因此，现在暂停视频，通读一两次报纸，然后重启视频，我将引导你完成剪辑。因此，既然你已经通读了这篇论文，这是一篇有趣的论文。这里有一个很酷的概念。我们把蟑螂当作生物机器人，生物机器人。所以它在这篇论文上也有一个非常不错的挂钩。我将仔细检查并再次对其进行编辑，寻找整体结构，并逐行编辑内容。所以我要进去这里和那里做一些编辑。我要重新整理几件事。因此，你可能已经注意到的一件事是，作者在论文中有很多关于该设备的技术细节，没关系。他们做得很好。尽管有很多技术细节，但我还是能够理解所有内容。因此，有这么多技术细节并不麻烦。但我想，也许我们可以为所有技术细节保留一段。因此，我将稍微移动一下，将有关该设备的各种技术细节放在一个段落中。所以现在我要再来一遍，有几个地方我可能会在这里和那里删除几个单词，然后四处移动一些东西。所以总的来说，它读起来非常好，这些只是简化它的几件事，稍微重新组织一下。这样流程就稍微好一点了。因此，如果我要仔细阅读第一段所说，科学家们仍在寻找小型机器人。这里有几个字我可以编辑。所以科学家们在找，我认为我们不需要静止物，他们正在寻找，然后我们得到了小型机器人。实际上，我认为我们不需要那里的单词大小，因为小意味着大小。因此，我们可以说科学家们正在寻找小型机器人。它可以在动态和未知的环境中导航。这是一种非常好的语言动态和未知环境。这是一种非常好的语言。实际上，我要补充一点内容，因为在本段末尾，他们谈到了关于幸存者和地震的想法。这是一个不错的小细节，确实让读者有理由理解，你会明白这个话题有多重要。所以我在这里只添加了一点。我添加了诸如地震后果之类的内容。我很早就有这个想法，这意味着我将能够从本段末尾剪掉一些材料。因此，它只会稍微简化一些事情。这一挑战激发了北卡罗来纳州立大学的这些研究人员使用蟑螂作为生物机器人的灵感。我在这里变化不大。我刚刚简化了这个，稍微把蟑螂变成生物机器人似乎是一个比用起来强一点的动词。你甚至可以在那里想出一个更好的动词来变换蟑螂之类的东西。然后我们让他们开发了一种无线生物接口，它使用电子接口来远程控制蟑螂。对于你真正想吸引读者的第一段来说，这有点过于冗长。所以我实际上并不认为我们需要所有这些生物界面，电子接口，它们有点模糊。读者，作者将在稍后的下一段中向我们介绍这个。所以我认为我们不需要所有这些。因此，这句话中最好的概念，最好的措辞是遥控蟑螂的想法。我想如果我们能用那几个词来准确传达这些研究人员想要做的事情。他们正试图远程控制蟑螂。所以我认为我们还不需要这些关于接口的东西，我们可以把它留到下一段。但我要从他们的遥控蟑螂开始下一句话。因此，这个概念很快就被传达出来了。你立刻知道我们在说什么。我们说的是遥控蟑螂。我们还不需要知道它是如何发生的，但这就是制作遥控蟑螂的想法。然后我喜欢这个由传感器组成的移动网络的想法。这是一种非常好的表达方式。所以我将从他们的遥控蟑螂开始，然后直接谈谈这个想法。所以总有一天他们的遥控蟑螂可以，我想总有一天我会说出来，因为现在我们还没到。这仍然是初步的，有朝一日可以用作传感器的移动网络。而且我们不需要重复，那会使用蟑螂，所以我们可以把它清除。收集和传输数据的传感器组成的移动网络。而且我们已经有了地震的想法，所以我只想说从难以到达的地方收集和传输数据，比如这样。实际上，关于自然灾害幸存者的想法，这是一个非常引人注目的细节。我将把它留到文章的结尾这样我们就有一些东西要结束这种包装，回到作品的开头。因此，这缩短了第一段，稍微缩短了一点，所以我们就开始讨论了。我们没有太多细节，但我们对研究人员在这里想要实现的目标有一个很好的了解。然后我们进入第二段。蟑螂有天线。顺便@@说一句，我真的很感激这位作者努力使用破折号、分号和冒号。因此，很高兴看到他们显然看了视频并仔细考虑了一下，并尝试实现其中的一些标点符号技巧。因此，对于老师来说，看到有人将这些事情付诸行动总是感觉很棒。我要改变几件事。因此，我认为这可能不是这里的破折号，而是一个额外的细节。所以我要把它放在括号里而不是破折号里，因为也许读者并不在乎天线到底叫什么。所以蟑螂有天线可以感知我喜欢这种感觉而不是感知。但这可以理解，这有点风格。实际上，我们可能不需要这里的冒号。再说@@一遍，我很感激他们尝试使用冒号。但实际上我们可以直接进入这个清单，这是一个非常简单的清单。所以，那里实际上不需要冒号。因此，蟑螂有叫做cerci的天线，可以感知触觉温度和湿度。我只想指出的一件事是，这里有一点不平行之处。因此，温度和湿度是名词。触觉实际上是一个形容词。因此，我们想通过将列表中的第一项设为名词来使之平行，所以我将其称为触觉输入。然后我们有研究人员。我们不妨说出特定的研究人员。所以我只想用他们的姓氏。所以这两位研究人员Latif和Bozkurt，我说的没错。然后我们可以使用这些天线通过向蟑螂发送一系列电脉冲来驱动蟑螂。所以我认为这里是发挥创意的好地方，因为他们开发了一种设备，所以创造了一种无线设备。因此，假设你已经摆脱了他们的所作所为。他们所做的大部分工作，要点是他们创造了一种连接到这些天线的无线设备。因此，让我们也尽早了解这个概念，这样读者就可以很容易地想象发生了什么。因此，这些是实际连接到天线的无线设备。所以早点就明白了。在这篇文章中，读者可以非常具体地了解这里发生的事情。并且可以提供驱动蟑螂的小电脉冲。因此，这是一个高层次的总结，我喜欢用什么来驱动电气，电脉冲驱动蟑螂，而不是反过来将这些概念组合在一起。所以这就是为什么我在开车之前先放电脉冲。我认为它在那里效果稍好一些。因此，我们现在可以得到一个高层次的摘要。我们得到了一台无线设备，它可以连接到天线，可以提供驱动蟑螂的电脉冲。因此，这实际上是在总结这款设备的确切功能。然后我们得到了很多关于系统的细节，我实际上要把这些细节放下来，然后写成一个新的段落。因此，让我们来一段包含有关该设备的所有技术细节。在第二段中，让我们对设备的确切功能进行高级总结。我真的很喜欢他们在第三段中写下的这句话。这些冲锋欺骗蟑螂以为天线与物理屏障接触。这实际上使他们朝着相反的方向前进。当我读到这篇文章时，我终于明白了这个设备的工作原理。所以，我认为这个细节真的很重要，要尽早知道，因为它确实可以告诉读者这个东西是如何运作的。所以，我将把第二段留在那里。它对设备的作用及其工作原理进行了高级总结。而且它是一个易于阅读的摘要，因此读者可以立即想象这个东西是如何工作的。然后，我们可以详细介绍摘要中技术部分的实际细节。所以这个系统包括，我喜欢设备，让我们暂时谈谈这个设备。因此，该设备由带有Zigbee接口电极的微处理器和一块电池组成。用户使用Zigbee收发器以无线方式控制微处理器。其实我要把这两个想法联系起来。因此，设备由此组成，然后用户使用此Zigbee收发器控制设备。我认为我们不需要再说无线话，因为我们已经说过这是一台无线设备了。所以我们不要重复自己，我要把这句话说完。事实上，微处理器使用电极向蟑螂天线发送电脉冲，蟑螂就会移动。猜猜怎么了？我们在第二段中已经说过了，所以我们不需要任何这些。因此，现在我们已经讨论了设备本身、微处理器、收发器、电极和电池。因此，实际上，这是向上移动作者在下面所说的东西的好地方。作者谈到了设备中使用的特定微处理器。因此，在我看来，在这里讨论这个问题是完美的。因此，我将把它从第三段向上移动。因此，现在，只要我们在谈论设备，我们就来谈谈设备中的微处理器。因此，研究人员进行了评估，我将把评估改为经过测试的，我更喜欢那个，经过测试的两个微处理器。我认为我们不必说控制电极。这是暗示的，所以我们可以直接谈这个问题。我们知道有一个微处理器，以下是他们测试的两个微处理器。然后由于这些原因，他们CC2530变得更好了。我猜这意味着他们合并了，他们测试了两个微通道，但他们最终使用了CC2530。因此，假设由于这些因素，他们在最终设备中集成了CC2530。在他们的最终设备中，由于重量轻，其Zigbee模块连接显然是我们导入的。它必须与Zigbee连接然后我们才能获得21个通用型I/O的任何可用性。我不太确定那是什么。所以，我猜在这里，我完全是在猜这里。以及更多数量的I/O部件。无论是在I上还是ports上，这都完全是平行的。所以，我的意思是，我像这里的小电极一样想象。所以，我不确定自己有没有这么安静。所以，我要重点介绍一下。这样作者就可以看待这个问题然后用一种我能理解的方式来表达。我认为我们不需要知道电池的细节，所以我实际上要削减这个细节。因此，他们将CC2530整合到最终设备中，因为它的重量很轻，它是Zigbee模块的连接性。而且I/O端口的数量更多，因为他们说有21个。所以我猜了一下，希望我做对了。但是，如果没有，我就要重点介绍一下，这样作者在修订版中就可以放一些相似但如果不准确的话是准确的。那么我们就来看看这里的研究人员究竟使用了什么蟑螂。所以我只用他们的姓氏。拉蒂夫和博兹库尔特使用了马达加斯加嘶嘶蟑螂。在他们的分析中，我认为我们不需要对吧。我们只需要知道他们之所以使用它，是因为再说一遍，我很感激作者使用冒号。但是我们可能不需要这里的冒号，因为它是一个相当简单的列表。因此，由于其尺寸更大，因此速度快，寿命长，坚固耐用。而且我喜欢在列表的末尾加一个逗号。所以一切看起来都不错。在实验开始之前，他们已经麻醉了。，我想我只想说麻醉后我们可以把它分解成。我拼得对。通过冷疗对蟑螂进行麻醉后，我们可以直接进行45-60分钟。他们需要在连接电极之前对其进行麻醉。他们附着电极的一侧，我们可以直接进入那边，所以他们麻醉了它们。在他们麻醉它们之后，他们连接了每个电极的一侧？也许是电极的一面？我想可能是每个电极的一面，再说一遍，我会和作者仔细检查一下细节。在那里，但是说起来好一点，从每个电极到天线。而且我真的很喜欢这里用作电子控制的措辞。我以为这是个不错的表达方式，但实际上我们已经在第二段中说过了。它向啮齿动物，蟑螂的神经组织提供少量电荷。所以实际上，我要把它清理掉。我们只需要知道，在他们麻醉了这些虫子之后，他们把电极固定在了天线上。而且我们不必再重复一遍，它还在传递这些小的电脉冲。尽管我喜欢电子雨的视觉效果。因此，如果有办法把它改回第二段，我鼓励作者这样做。有一些不错的语言。现在，在下一段中，我们开始实际测试。于是他们制造了这个设备，然后在真正的蟑螂身上测试了这个设备。这是我想要更多细节的部分。我想更多地了解他们实际测试蟑螂时会发生什么。所以我要说的是，在系统的测试中，我会非常明确地让读者知道。因此，我们开发了这个系统，也对其进行了测试。因此，在对系统的测试中，蟑螂以实验室地板上绘制的S形轨迹掉落，花了81秒钟，成功率为10％，完成了路线。现在，我想知道这是否是错误。我要推迟最后的离别想法然后把它写成一个新的段落。因为系统中的这个测试确实值得有自己的段落。我想知道完成这条路线的成功率是否应该是100%。因为如果成功率只有10％，我认为那不是很好。所以我想重点介绍一下并问问作者这是否可能是个错误？如果应该是100%？或者，如果成功率只有10％，我想更多地了解为什么他们仍然对这个系统充满热情。我们需要更多细节。那又怎样，他们还测试了什么？那是他们唯一做的测试吗？再给我一些细节，说明到底发生了什么，结果有多有希望。因为这是设备原理的证明。因此，我们需要更多关于实验那部分的细节，所以我想请作者补充一下。然后最后一句话，这将成为最后一段，将进入最后一段。因此，这一发现为科学家们开始使用昆虫和生物机器人打开了大门。而且biobots里有一点语法错误。我可能会把它切到那里。然后一个新的想法是，系统的重量仍然是一个问题。所以我想我需要多做一点设置，因为我不确定为什么重量还是个问题。看来蟑螂很小，它们的设备很小。那么，为什么体重还是个问题呢？所以我觉得我们需要更多关于这个问题的细节。你可以把它放在最后一段的第二段。或者也许可以从课堂段落开始，这个系统还是太大了，因为，请告诉我为什么需要进一步缩小系统。因此，需要进一步的研究来减轻系统的重量，因为，我需要知道为什么。因为我不确定为什么这还不够小。如果我们说的是负面和缺点以及挑战是什么，那么可能就需要过渡了。也许你需要一个但是那里的东西才能过渡到最后的想法，那就是这还是很酷的。但是这一发现为科学家们开始使用昆虫作为生物机器人打开了大门。我想说的是作为生物机器人而不是生物机器人。然后，你可以到此结束，也许在这里添加最后一种离别想法真是太好了。因此，我再次提到，我删掉了第一段，具体提到了地震幸存者。因此，也许我们可以在最后添加一些内容来总结开头。总有一天，蟑螂大军，可能是救援自然灾害幸存者或类似事物的最大希望。自然灾害。所以也许是这样的东西，有点回来。总有一天，成群的蟑螂可能是救援自然灾害幸存者的最大希望。所以，再转一遍，有点回想起初的想法。只要给它一个不错的结局就能把它绑在起点。所以现在我认为它读起来非常好，它的设置很不错。我们有一个很好的介绍，可以吸引你进入这篇文章。我们对这款设备进行了概述，但没有太多的技术细节。我们有一个很好的段落，其中提供了有关技术细节的所有信息。我们知道它们实际上是如何把它附着在蟑螂身上的。然后，我们得到了一些关于系统首次测试的信息。这就是我希望作者多加一点信息的地方，然后我们就会想出一个离别的想法。也许还有一些仍然存在的挑战。