**University of La Verne**

**CMPN 280: Computer Organization**

Final Project: Space-X Sn-15

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# Initiation

## Project objective and background : The objective of our project is to design a circuit that counts to five, the desired altitude of fifty thousand feet, that shows the separation, with a light, of the carrier and spaceship being released into the earth’s atmosphere. We are two computer science engineers who have decided to start working for the airline company Virgin Atlantic. This branch called Virgin Galactic, focuses on commercial space vehicles and travel. Their mission is to develop and operate a new generation of vehicles for open space for everyone to experience. They want to give a diverse group of individuals their very own, up-close view of space. They would go through training to become astronauts as soon as it is safely possible.

## Problem Statement : Our company decides to design a carrier aircraft and a spaceship that work in tangent to deliver the astronauts into the earth’s atmosphere. The spaceship will then be tilted and controlled from earth to give the best views of space and our planet possible. We need to design a circuit that allows the carrier airplane to let go of the spaceship once they both reach 50,000 feet to release it into the earth’s atmosphere. The carrier needs to count the increase of the altitude in the air and display the success of the separation.

## Project Scope : We need to be able to give a background of our company and state our object and how we are going to solve it. The scope of our project is to have a binary counter, a binary LED, lightbulbs to represent the number, and a light. We should also be able to explain how our circuit works. Development

## Project Design: For our project design, we modeled our circuit using the lab one, binary counter, as a template. In our project, we used a binary counter and lightbulbs to display the number in binary. We used a NAND gate to reset our counter when it reaches five. We used 3 NOT gates that connect to the lights that are not lit when the counter reaches 5 (00101). We used an AND gate that connected to the lightbulbs that are lit. An additional AND gate connects the 2 AND gates to be true and make the light turn on, to signify the disengagement of the spaceship from the carrier in the atmosphere.

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# Demonstration

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## Limitation of the project : Some of the limitations of our project include having to deal with money and the skills of the people paying to ride in the spaceship. Virgin Galactic is a private company that might struggle to maintain a reasonable budget to get a return on their research and funding investments. It also may be difficult to get people to pass the astronaut training required to go up into space if only an elite few get the privilege when working for governments.

# Conclusion

## If you were to do it again? What would you do differently? : If we were to redesign this project, we would make the binary counter count down after it reaches five to represent the carrier decreasing in altitude and returning to earth. We would also want to use different gates to make the lightbulbs evaluate to true to light up the lightbulb, instead of having lots of NOT and NAND gates. It would also be cool to have our lights form a picture of the space vehicles.

## Future expansion: Virgin Galactic is a one-of-a-kind company that wants to make a profit by making earth accessible for personal enjoyment. Them and companies like SpaceX, are proving that space should not just be limited to government activities. The technology and developments of this company will work to further enhance our knowledge and design of spacecrafts. Impact

## What is the impact of your organization with respect to the environment?

Virgin Galactic impact on the environment is very low. They use a unique benign hybrid rocket motor, biofuels where permissible and very high-altitude air launch and firing of the benign rocket rather than launching it from the ground. Virgin Galactic uses very little to none carbon dioxide when sending the spaceship into space.

## What is the impact of your organization with respect to culture?

Virgin Galactic’s impact on culture is having people explore space. As time goes Virgin Galactic could be the next SpaceX or partners with NASA which can affect the young generations.

## What is the impact of your organization with respect to social justice? Virgin Galactic is offering an opportunity that only a select few have been able to experience. We predict that the cost to buy a seat on the spaceship will be at a number that the average person will not even make over their lifetime. Given those details, this is going to be limited to only the very wealthy.

## What is the impact of your organization with respect to gender equity?

Virgin Galactic has about 50 - 200 employees and half of them are females and males. Generally, women don’t get paid as much as men do for the exact same job, but at Virgin Galactic, all employees receive the same pay.

## What is the impact of your organization with respect to global problems?

Virgin Galactic is the first purpose commercial spaceship. The company that sends people to space for exploration, in particular the planet earth. Virgin Galactic will help change the views of science and help the planet be safer.

Virgin Galactic is a company the world’s first purpose commercial spaceship. The company that sends people to space for exploration in particular the planet earth. I believe that Virgin Galactic will help change the views of science and help the planet be safer. Our project could have been improved further by making our counter count down after reaching five to show the carrier returning back to earth.