Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
Semester: (Spring, Year:2021), B.Sc. in CSE (Day/Eve)

Course Title: Engineering Drawing

Course Code: 208 **Section: 193**

Lab Project Name: 3D Bridge Design

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Submission Date **: 06.09.2021**
Course Teacher's Name **:Md. Gulzar Hussain**

[For Teachers use only: Don't Write Anything inside this box]

Lab Project Status

Marks: …… **Signature: .....**

Comments: ..... **Date: .....**

Chapter 1

Introduction

1.1 Introduction:

In this project we will show our project on bridge Design. We Implement Bridge design on Autocad. First of all we design our bridge in a 2d model then we form this 2d drawing into a 3d model and we use many features in our project.

1.2 Statement of the Problem

Developing intelligent 3D bridge models with autocad.

1.3 Scope of the Work

The scope of this project is to investigate the feasibility of using 3D tools in Autocad.

1.4 Design Goals

In this project Our Goal is to implement 3D Bridge Design perfectly.

1.5 Outline

In this context, the generation of three‐dimensional (3D) geometric models of bridges, which are to be designed and analysed, can play an important role. For this purpose, a computer graphic system, which enables the 3D geometric modelling of decks of the most frequent types of bridges, was developed. With this tool, the geometry of the bridge shape can be directly inserted into the computer application, using the user‐friendly interfaces with geometric parameters of the longitudinal view and cross section of the bridge deck. In this way, the description of the geometry, conceived for each case, is easily achieved. In addition, it satisfactorily supports a rapid definition of several suitable alternative solutions for the bridge.

Chapter 2

The Design Methods and Procedures

2.1 Introduction

A bridge is the type of structure whose appearance normally deserves more attention because it not only has an evident impact on the environment but also represents considerable investment, both of which justify careful evaluation. The aesthetic analysis is an important issue that must be considered when designing a new bridge, especially when it is to be built in an urban or road environment. In this context, the automatic generation of three‐dimensional (3D) geometric models of the bridge under analysis, and the walk around and aerial simulation allowed over it, which can be generated, helps bridge designers to evaluate its aesthetic concept and environmental impact. The bridge construction process can also be simulated, helping designers and builders to review the progress of the construction work in situ.

2.2 Procedures

Here Are our implementation procedures:

1.At first We took a line of length 20 cm.
2.Then We Offset command to parallel line and it's length is 2.5cm
3.After that, copy the parallel line 11 times and the distance between is 15 cm.
4.And draw a half circle ARC command whose radius is 10.61cm.
5. Then We trim all the unnecessary lines.
6.We used the presspull command to create a 3D surface.It's height is 30 cm.
7.Drawing a railing by swap command .
8.We draw bridge railing outside of our bridge .We join it by move and copy command.
9.Then join all materials by union command.
10.Colouring of our bridge by Matbroswer command.

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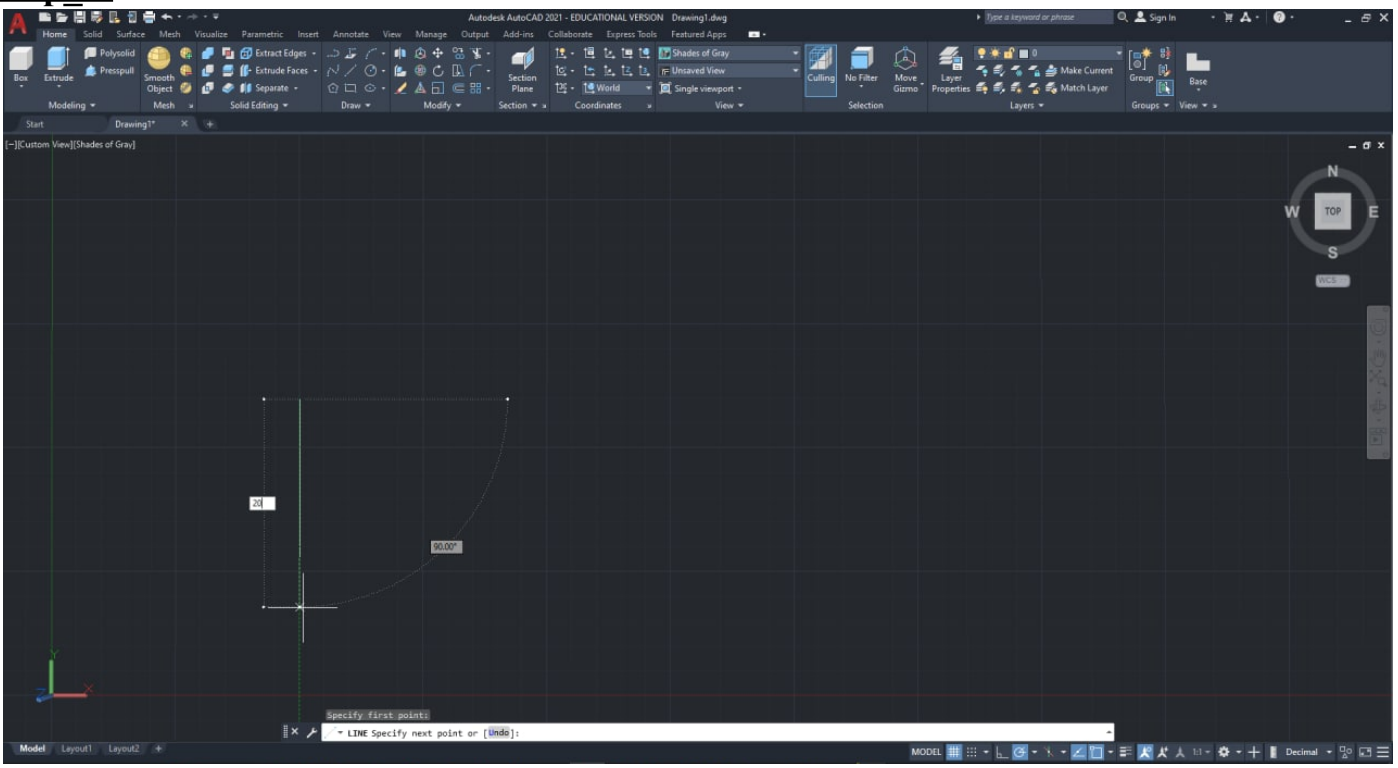
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LINE Specify next point or [Undo]:
Model
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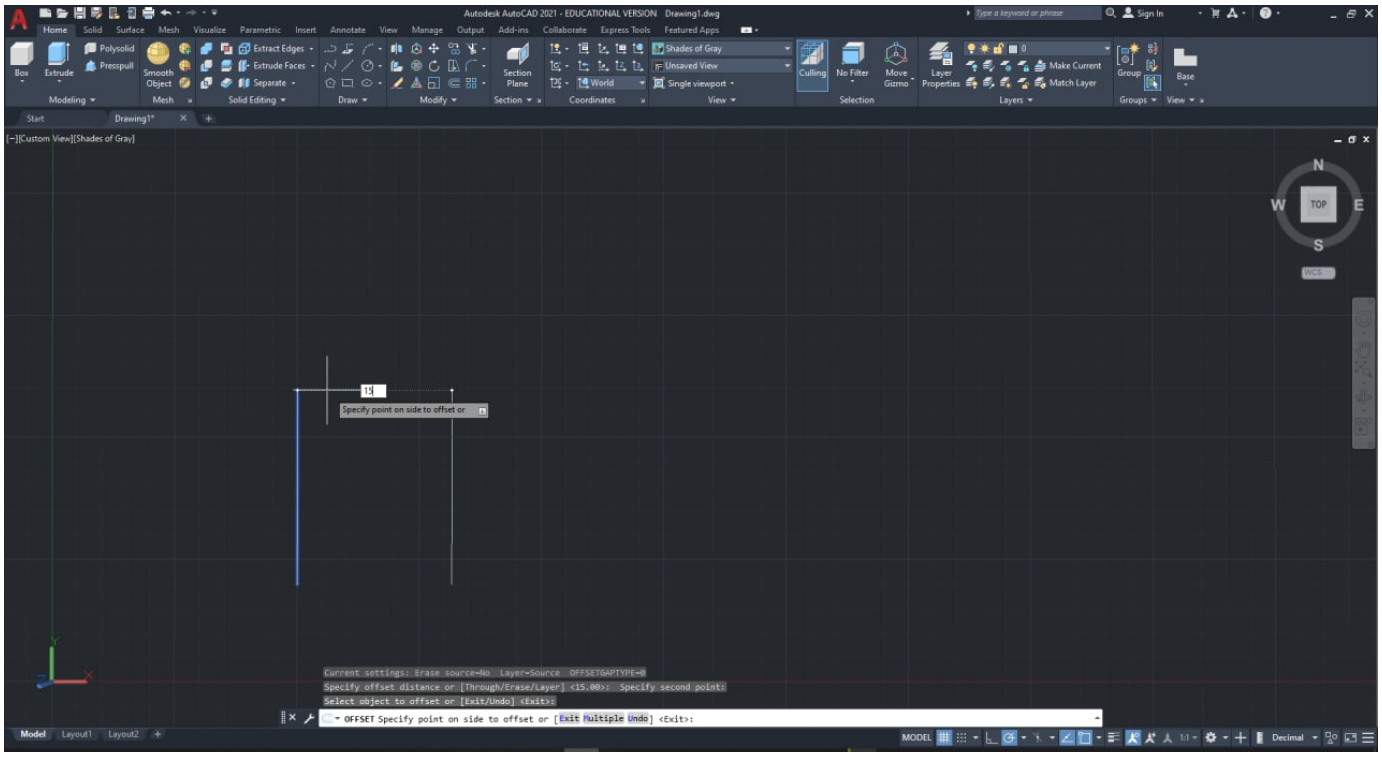
step_2: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15
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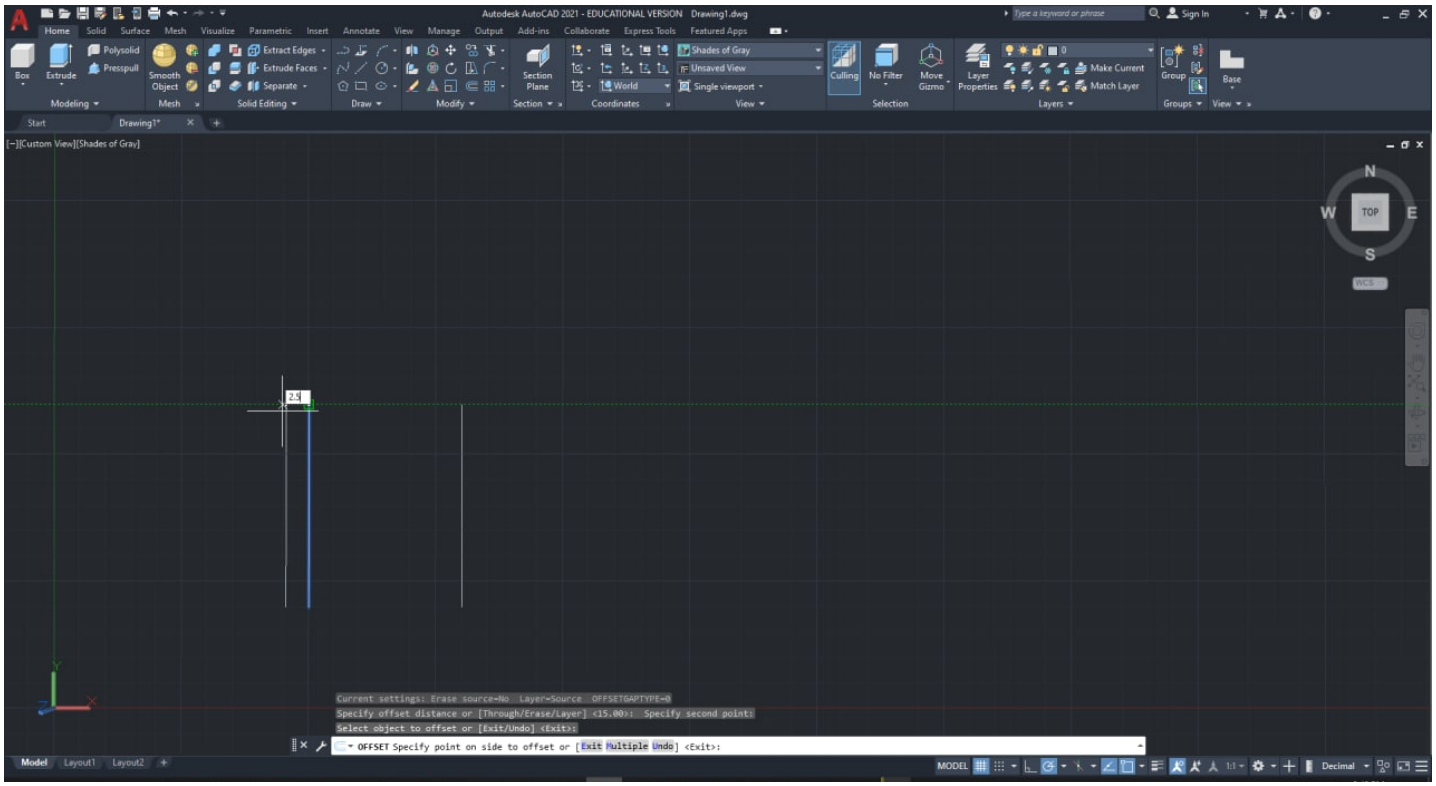
step_3: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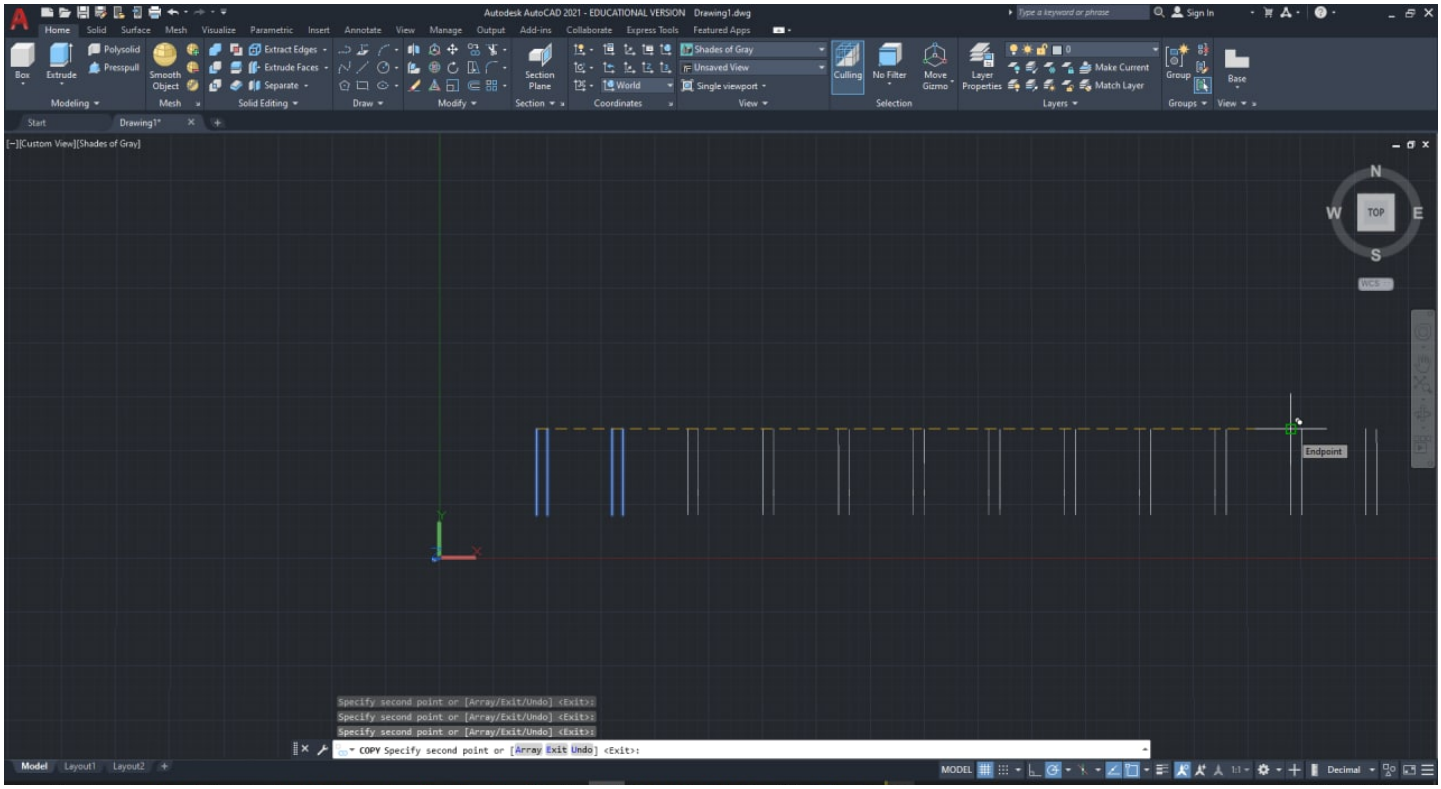
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COPY Specify second point or [Array Exit Undo] <Exit>:

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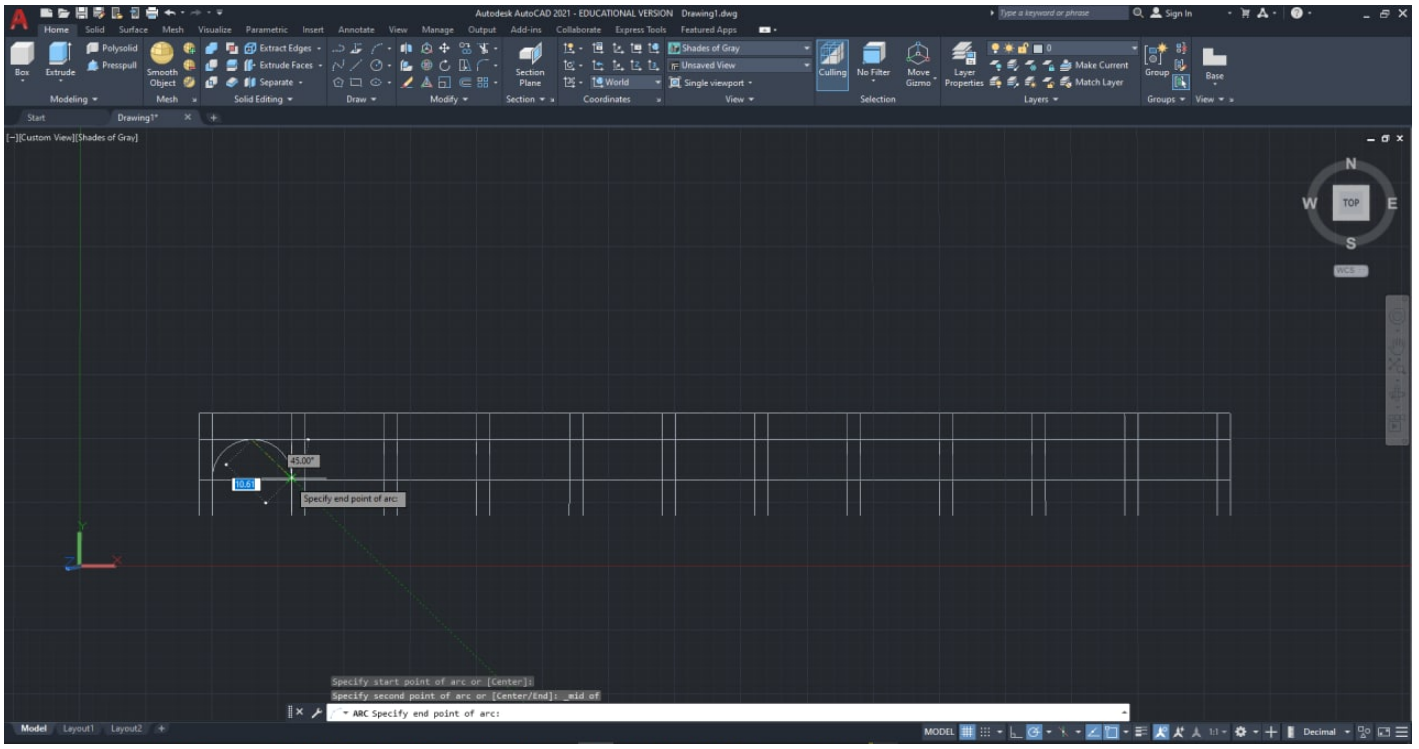
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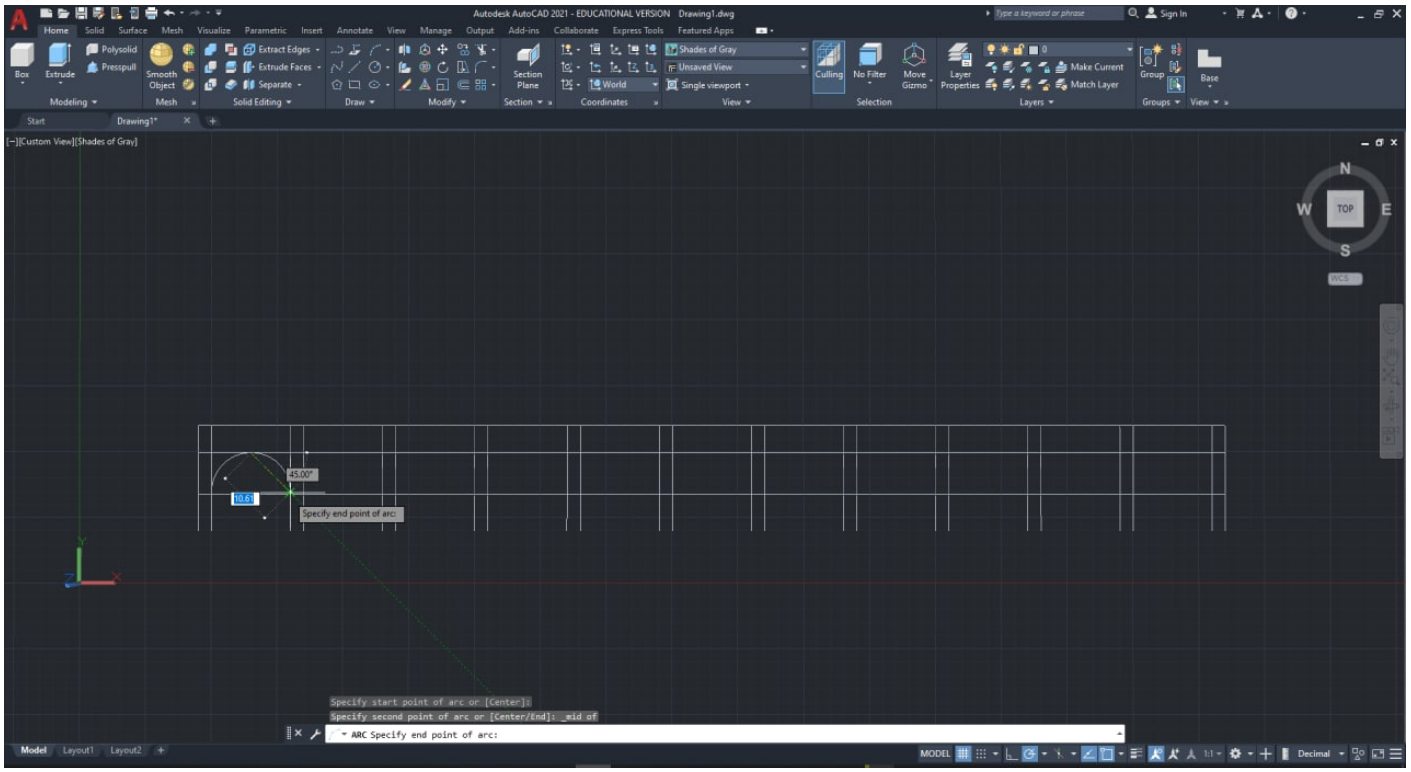
ARC Specify end point of arc:

step_6: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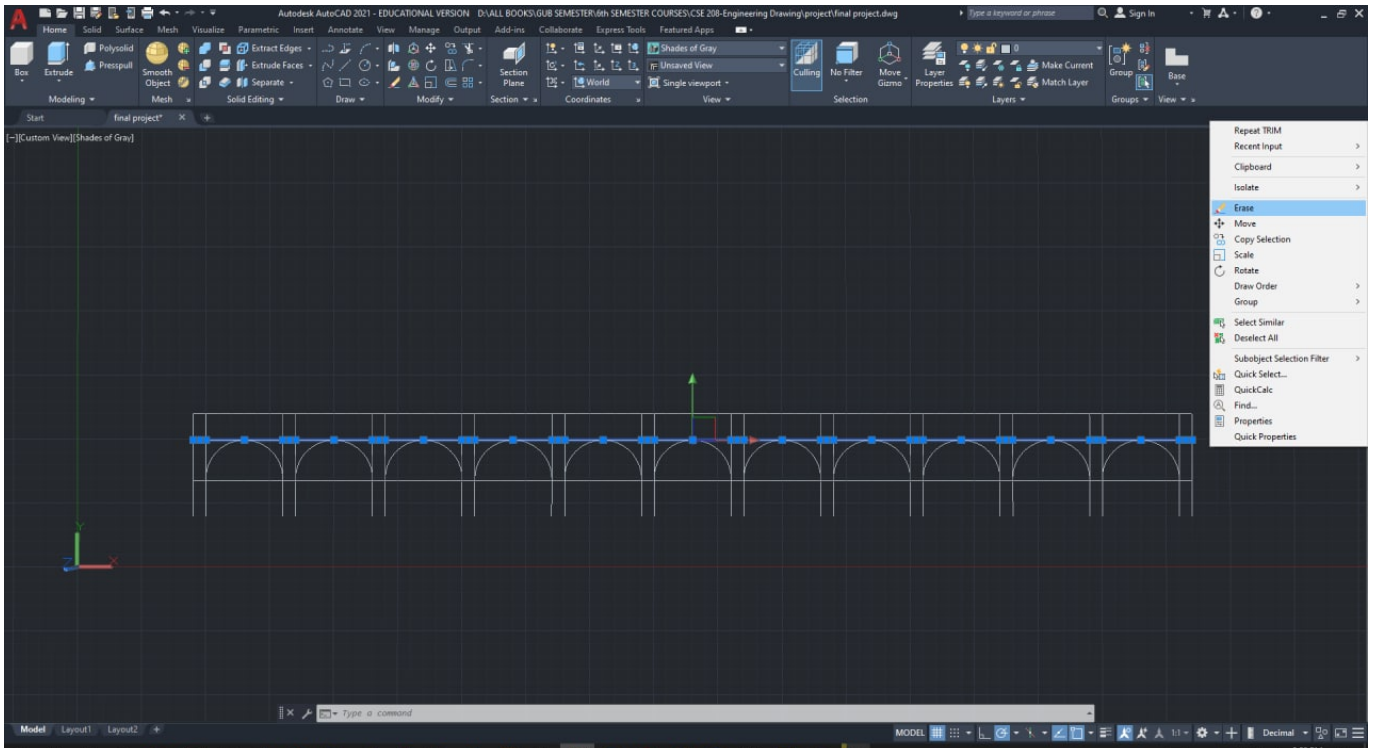
ARC Specify end point of arc:

step_7: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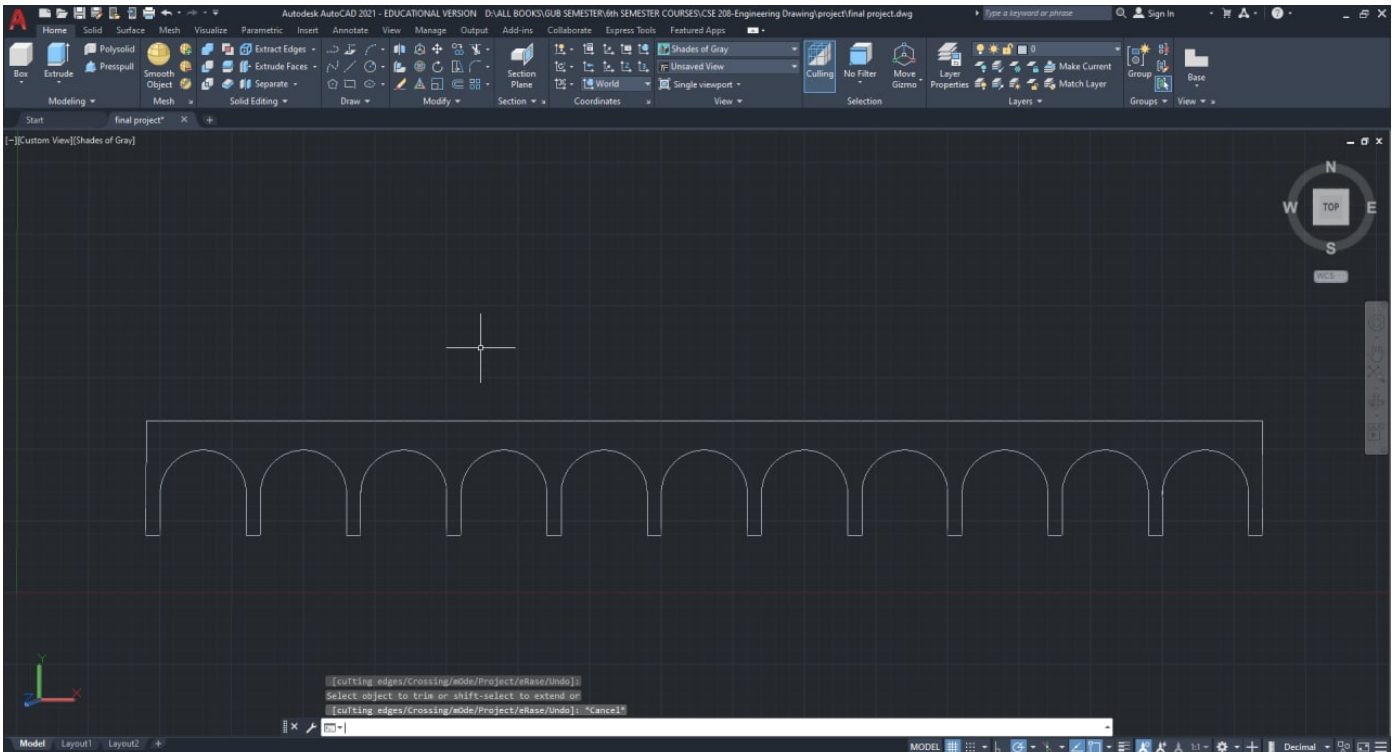
Repeat TRIM
Recent Input
Clipboard
Isolate
Erase
Move
Copy Selection
Scale
Rotate
Draw Order
Group
Select Similar
Deselect All
Subobject Selection Filter
Quick Select...
QuickCalc
Find...
Properties
Quick Properties

step_8: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Select object to trim or shift-select to extend or
[cutting edges/Crossing/mOde/Project/eRase/Undo]: *Cancel*

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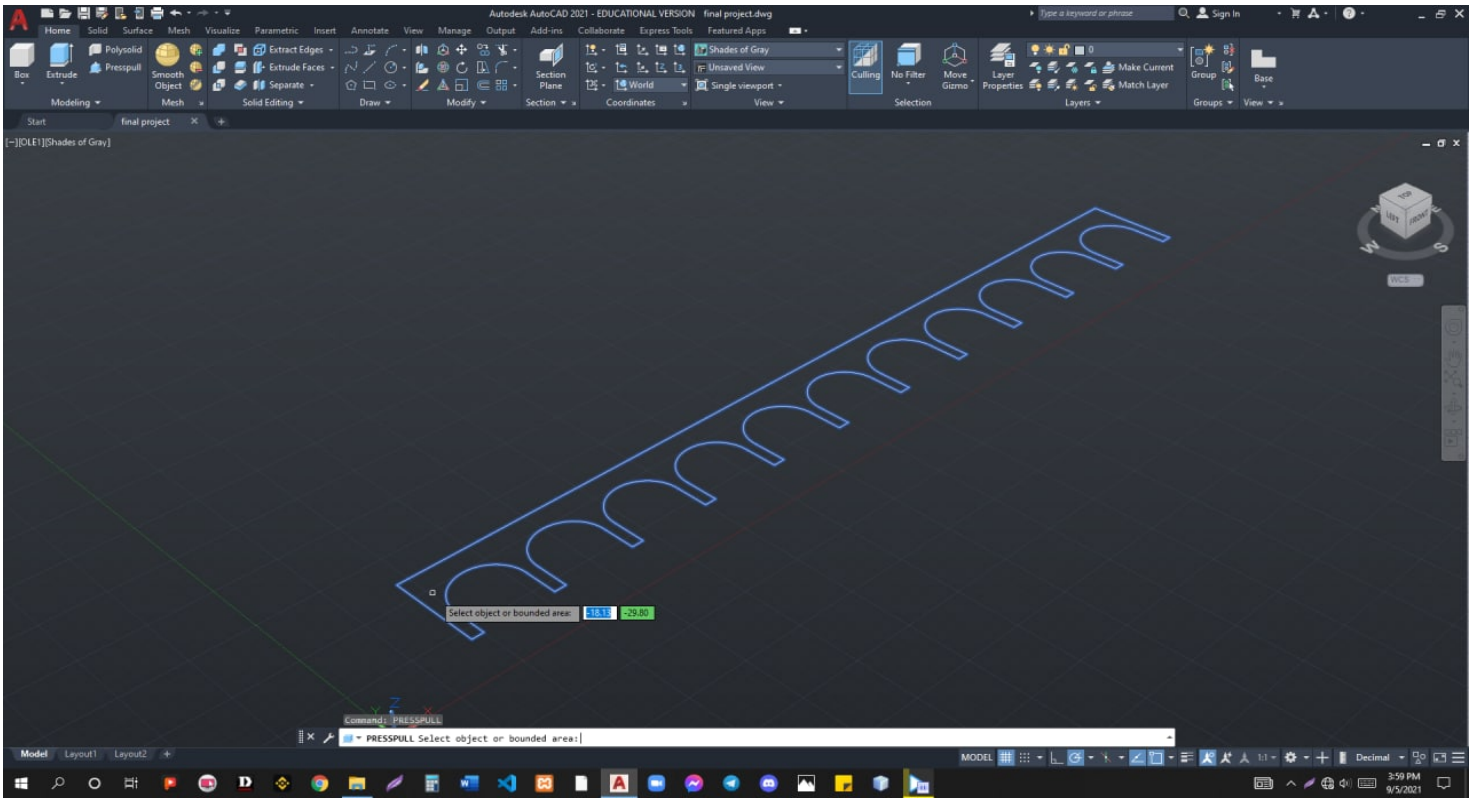

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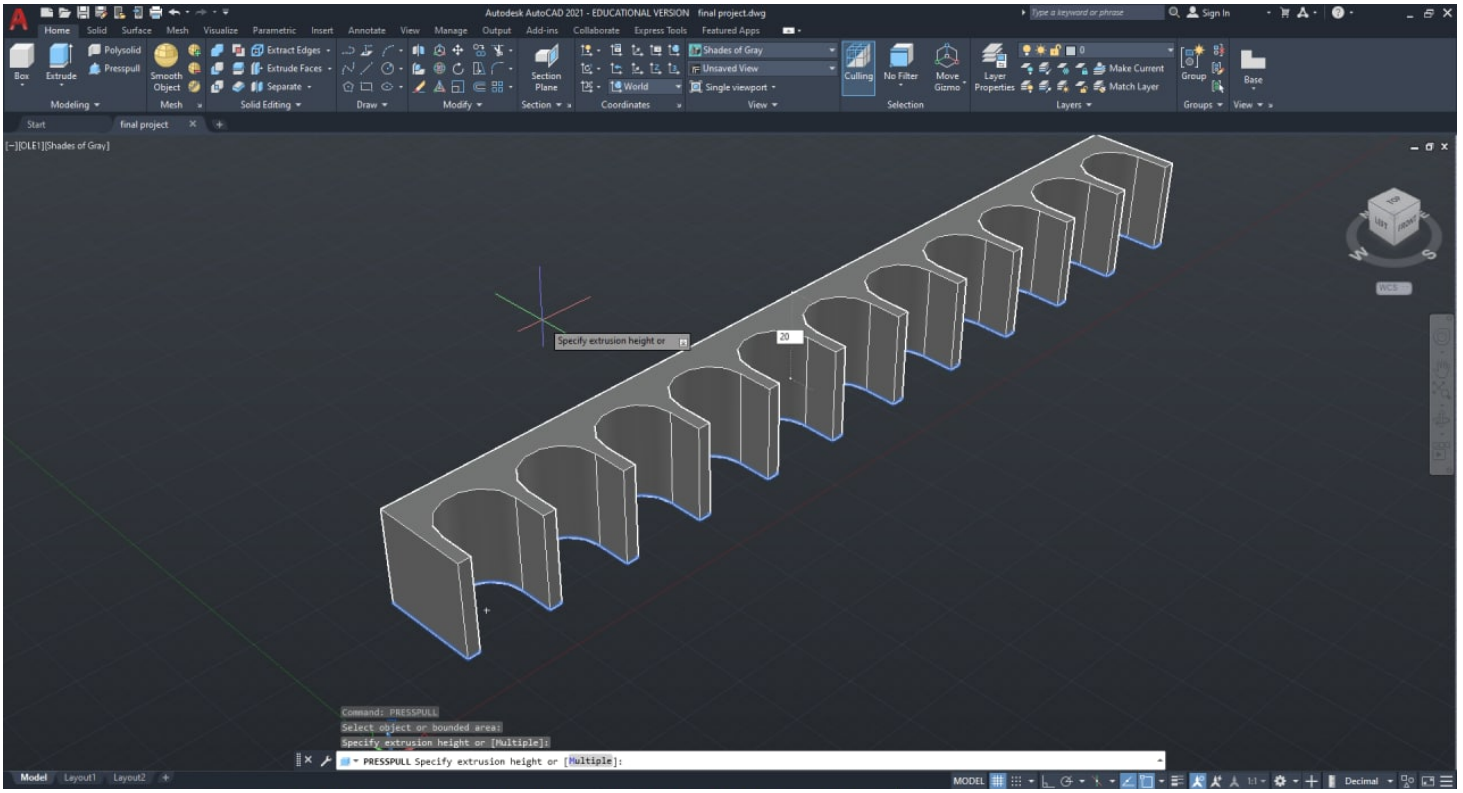

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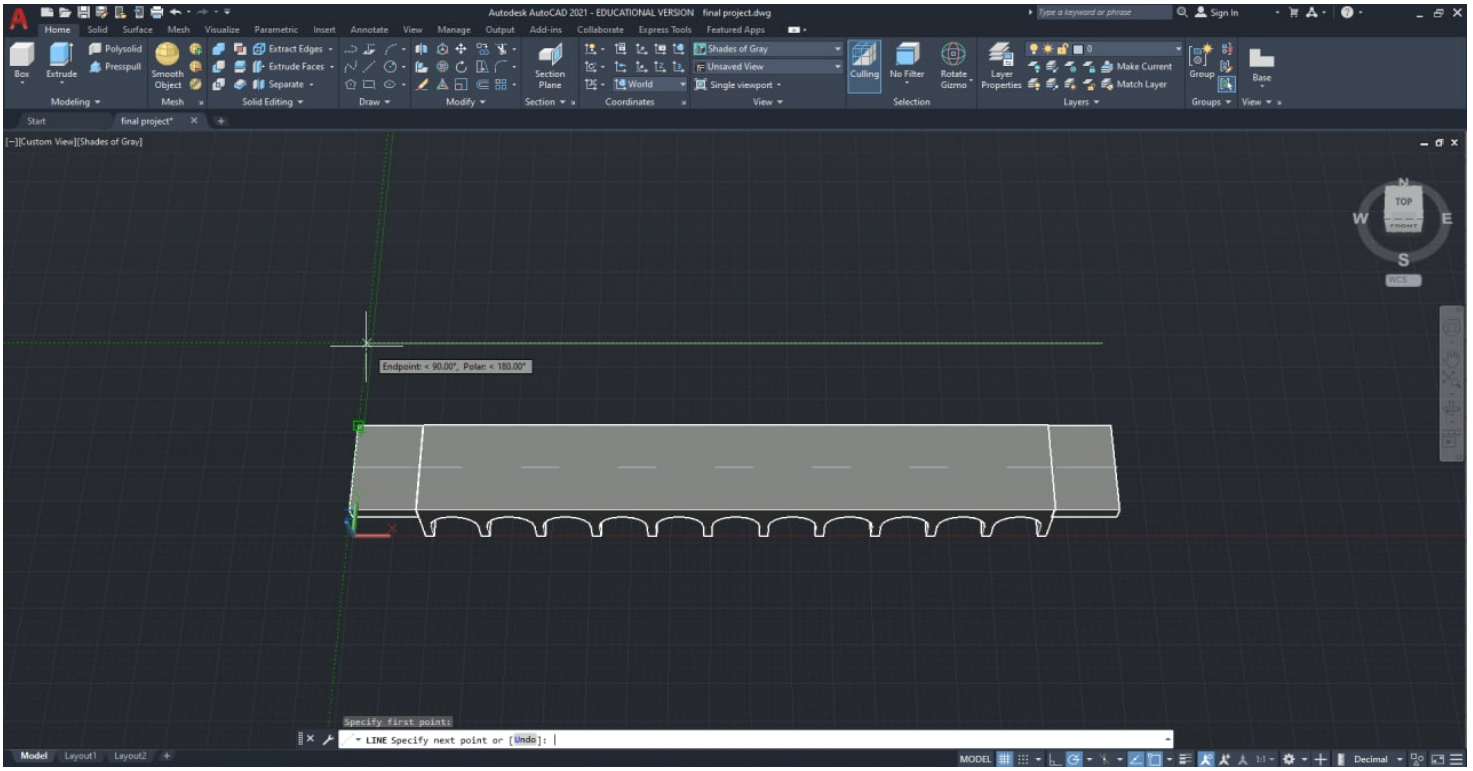

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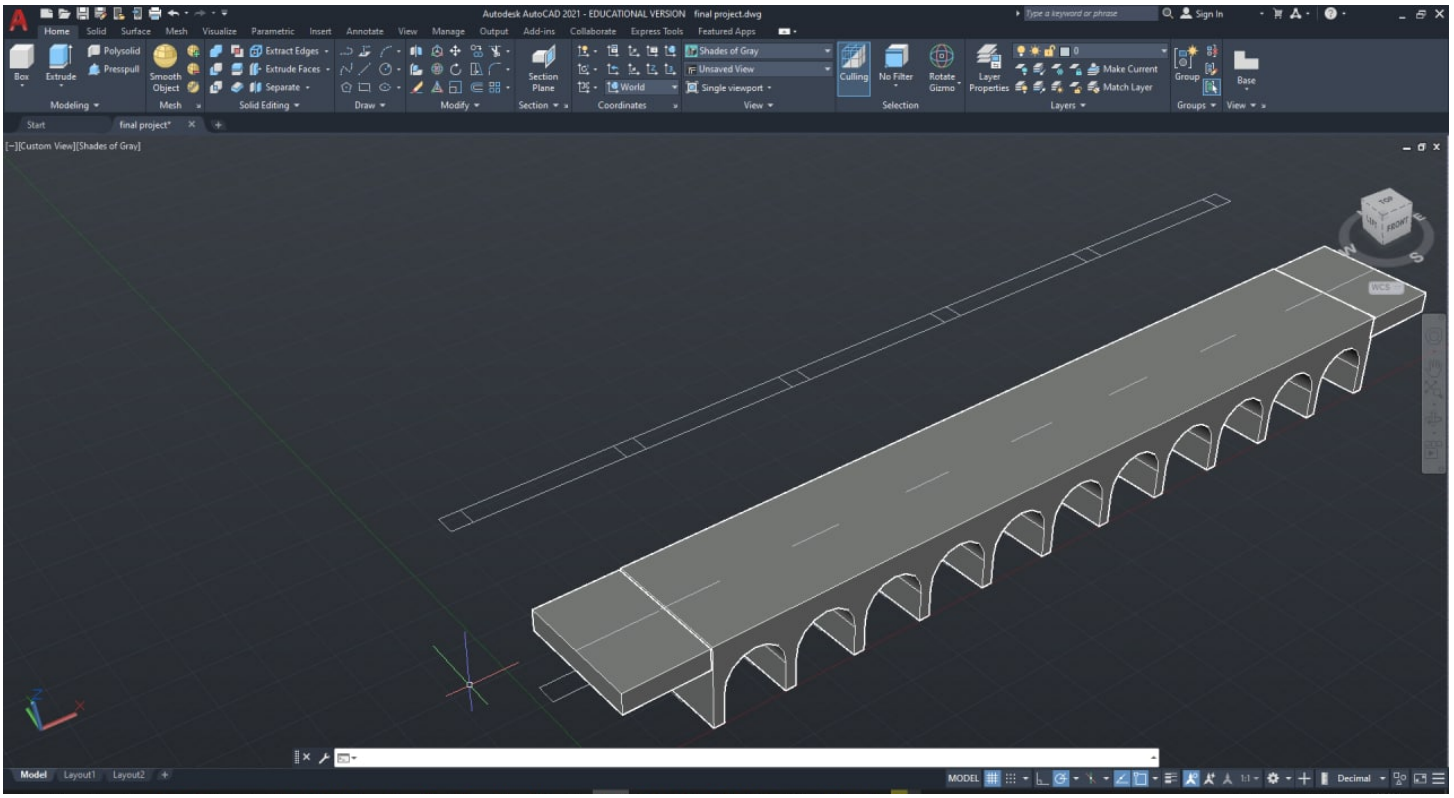

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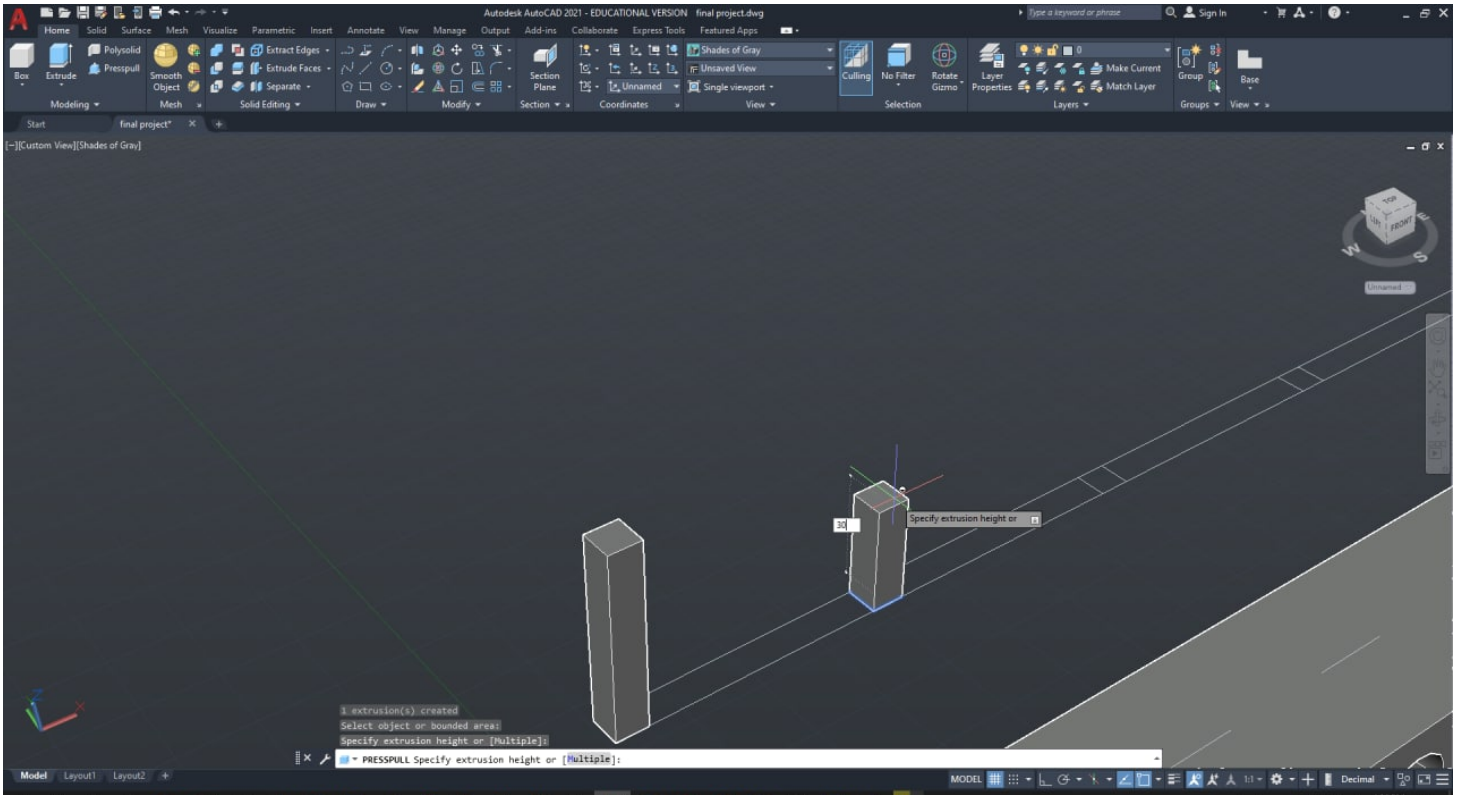

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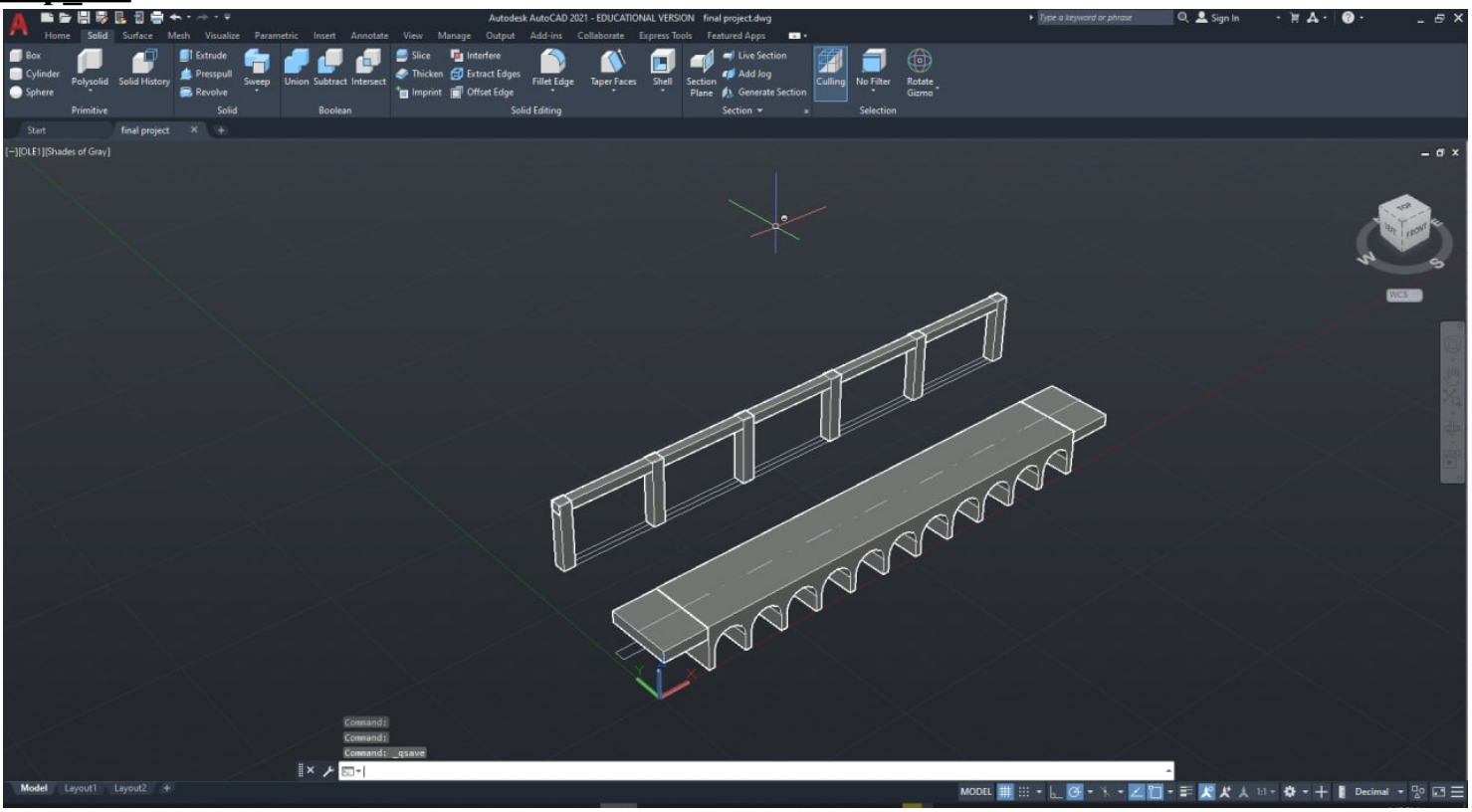

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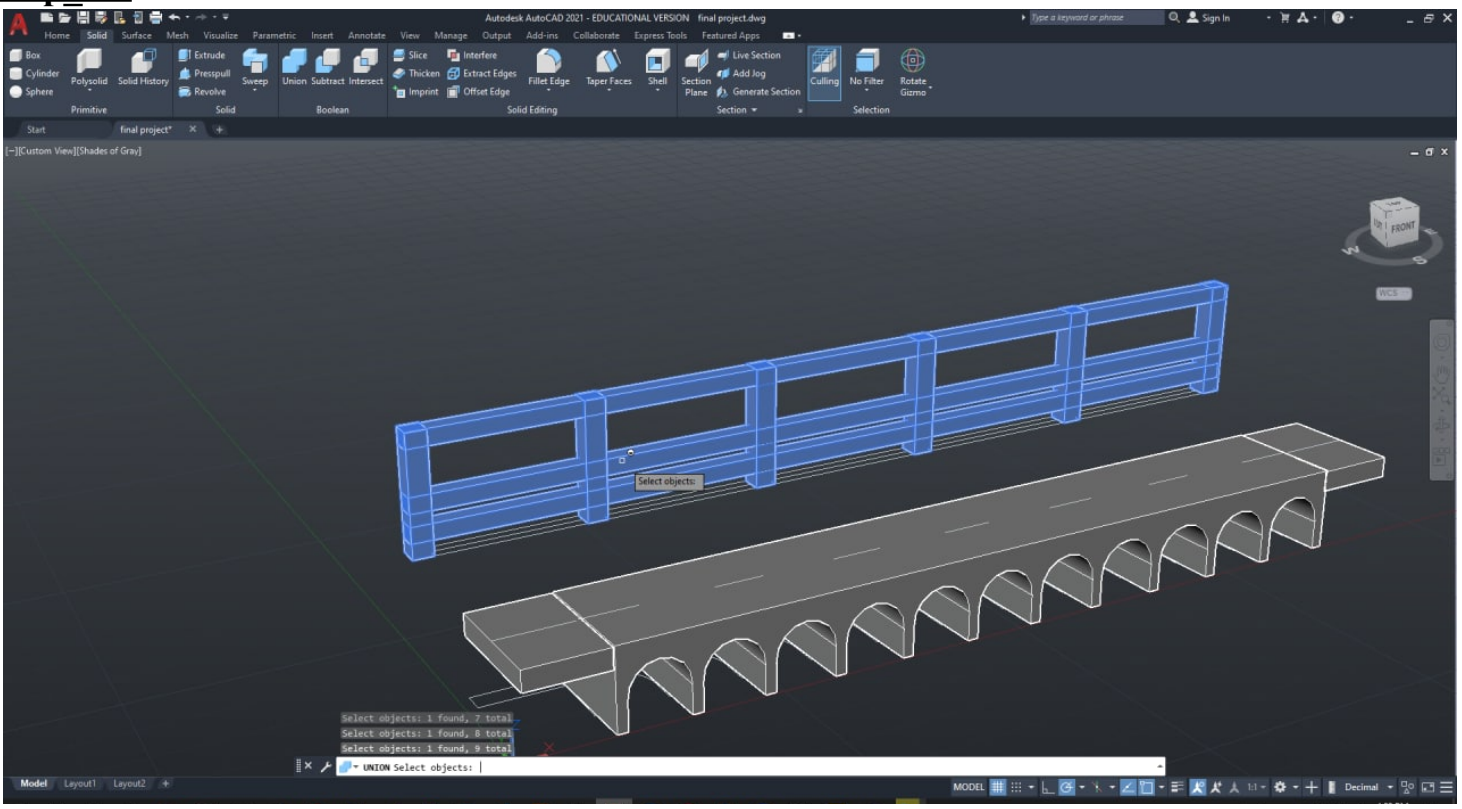

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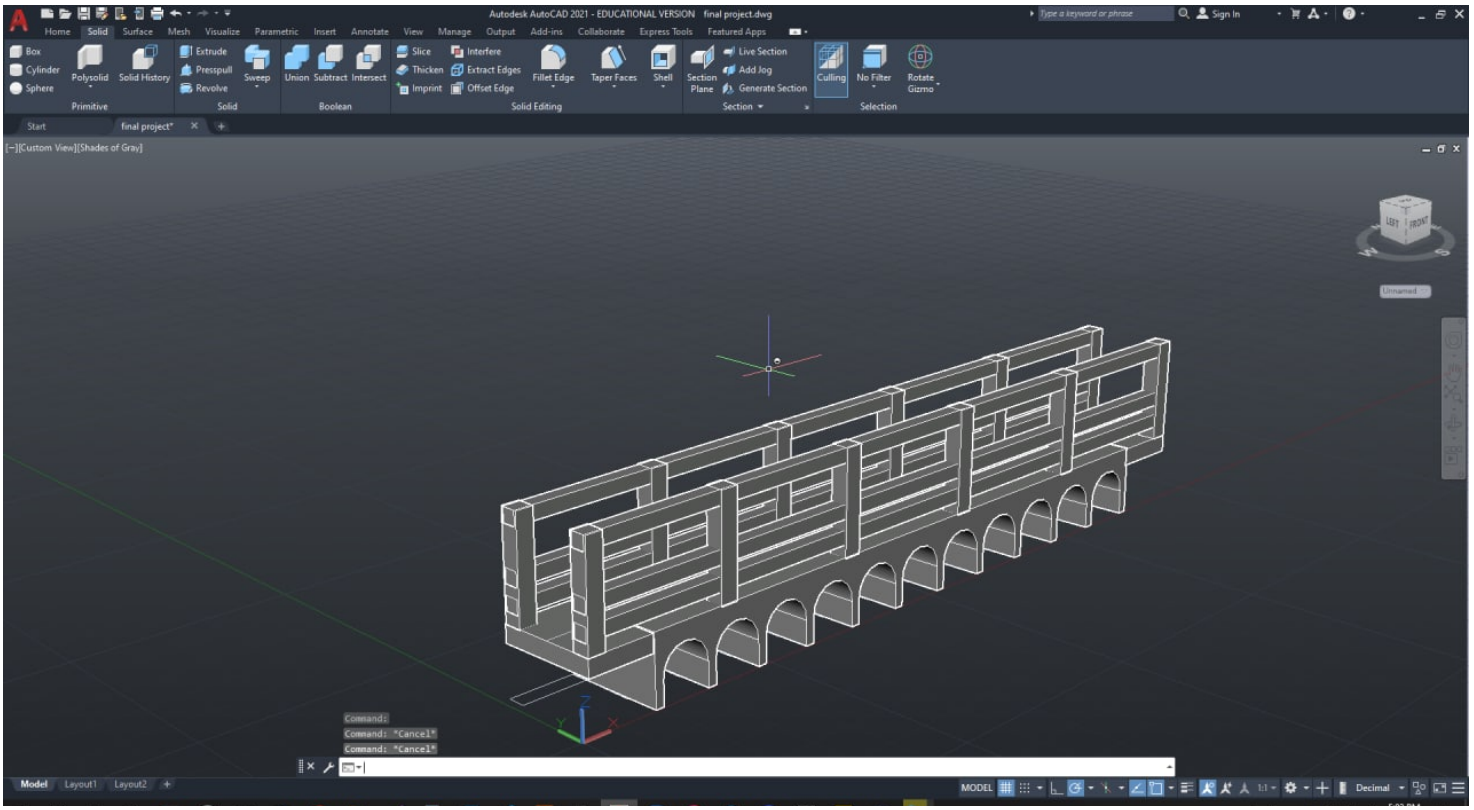

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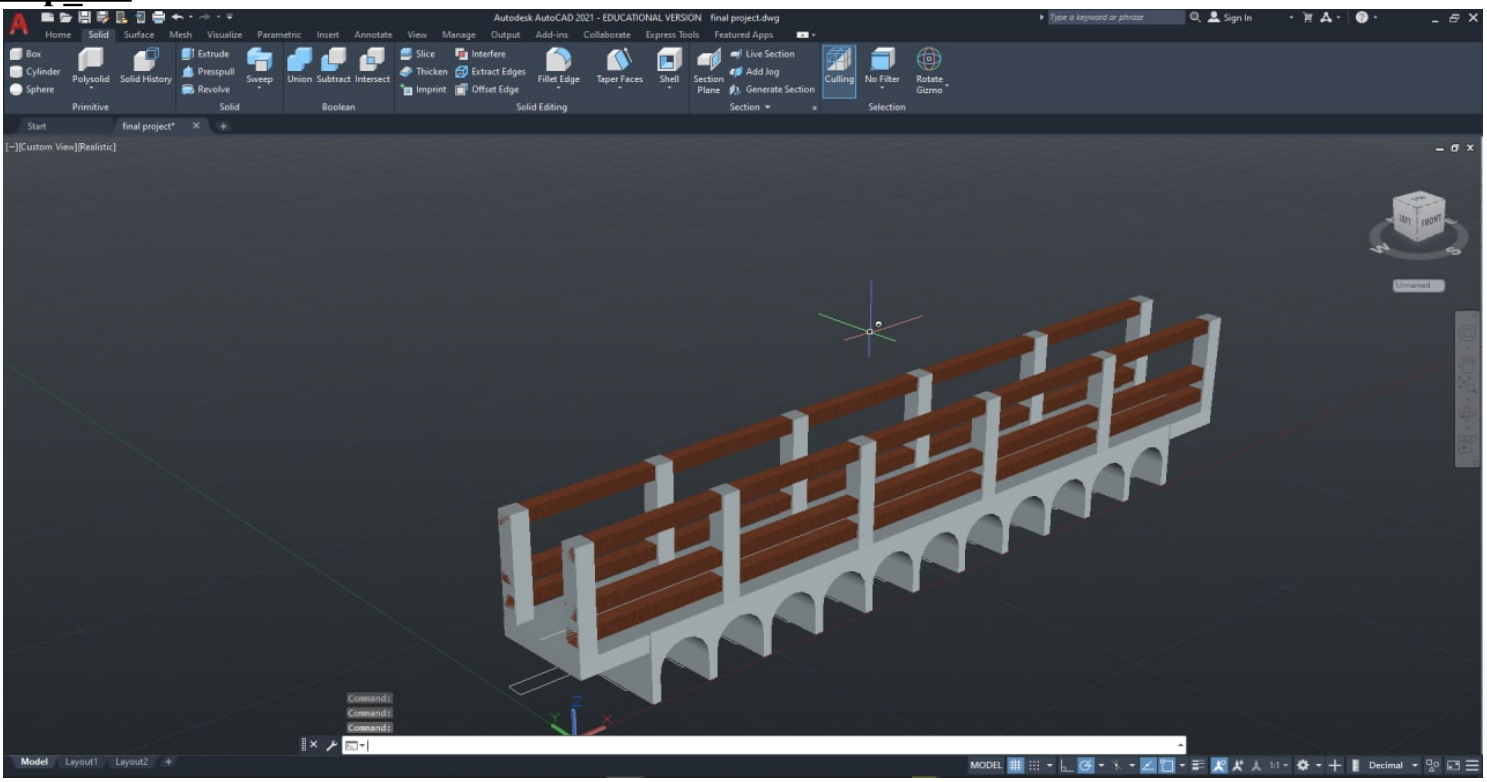

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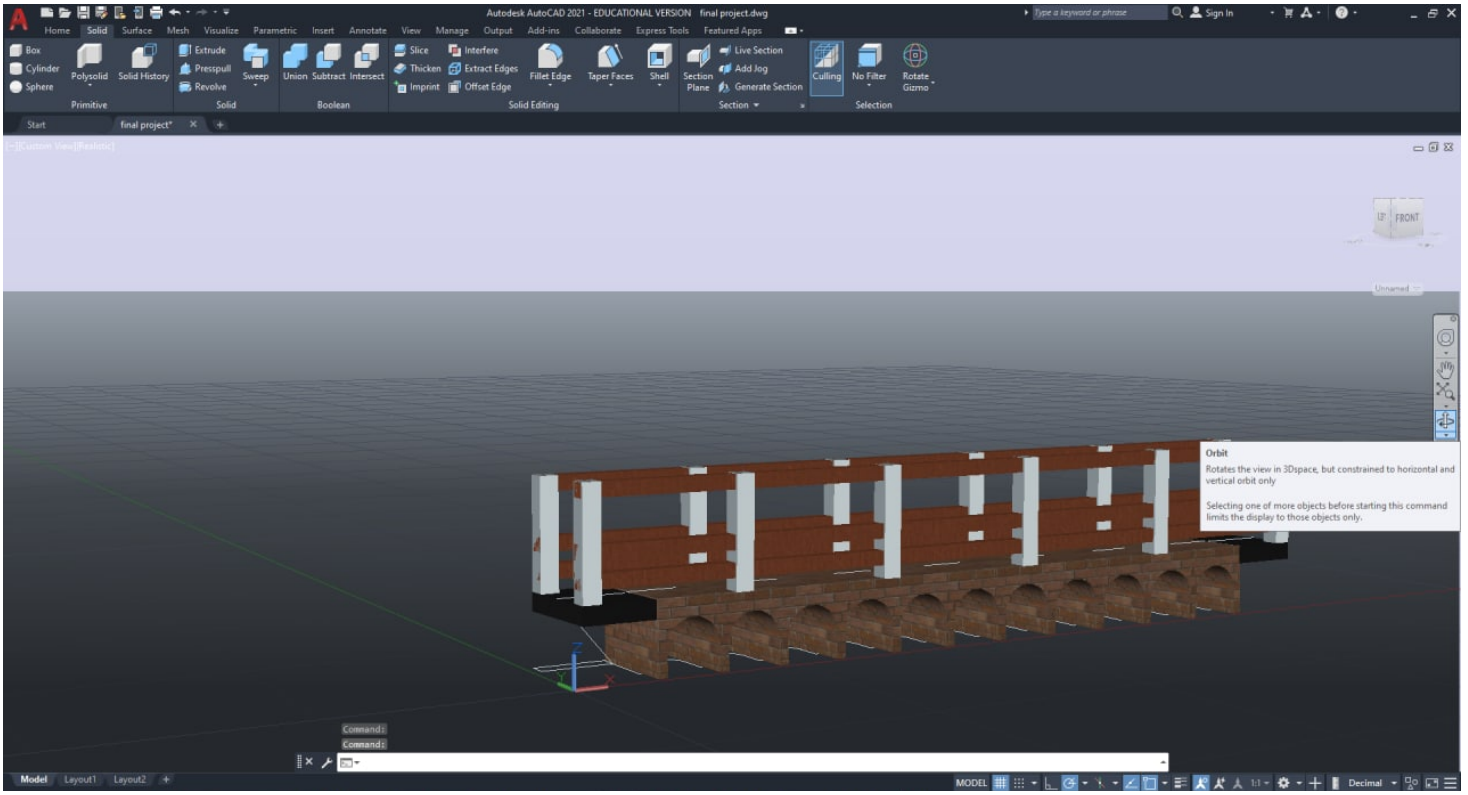

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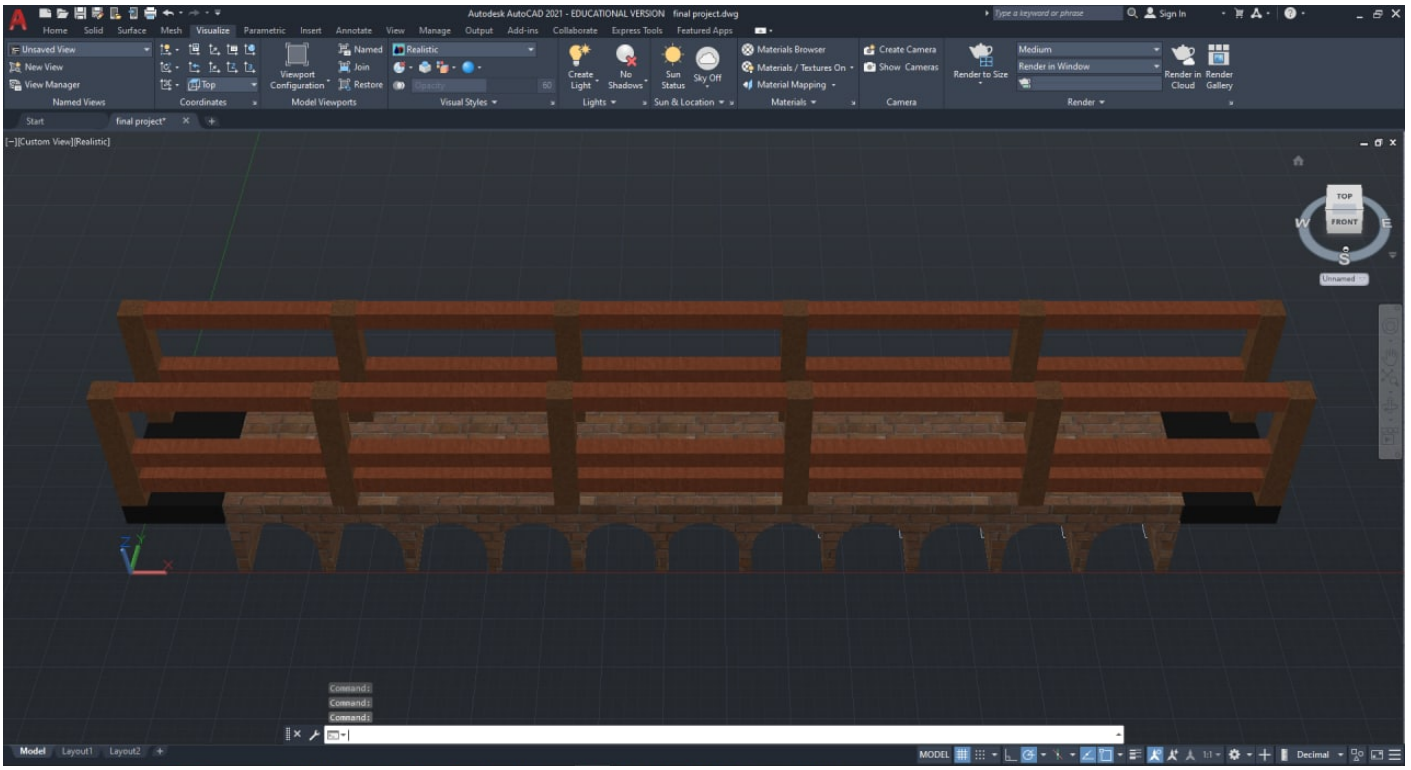
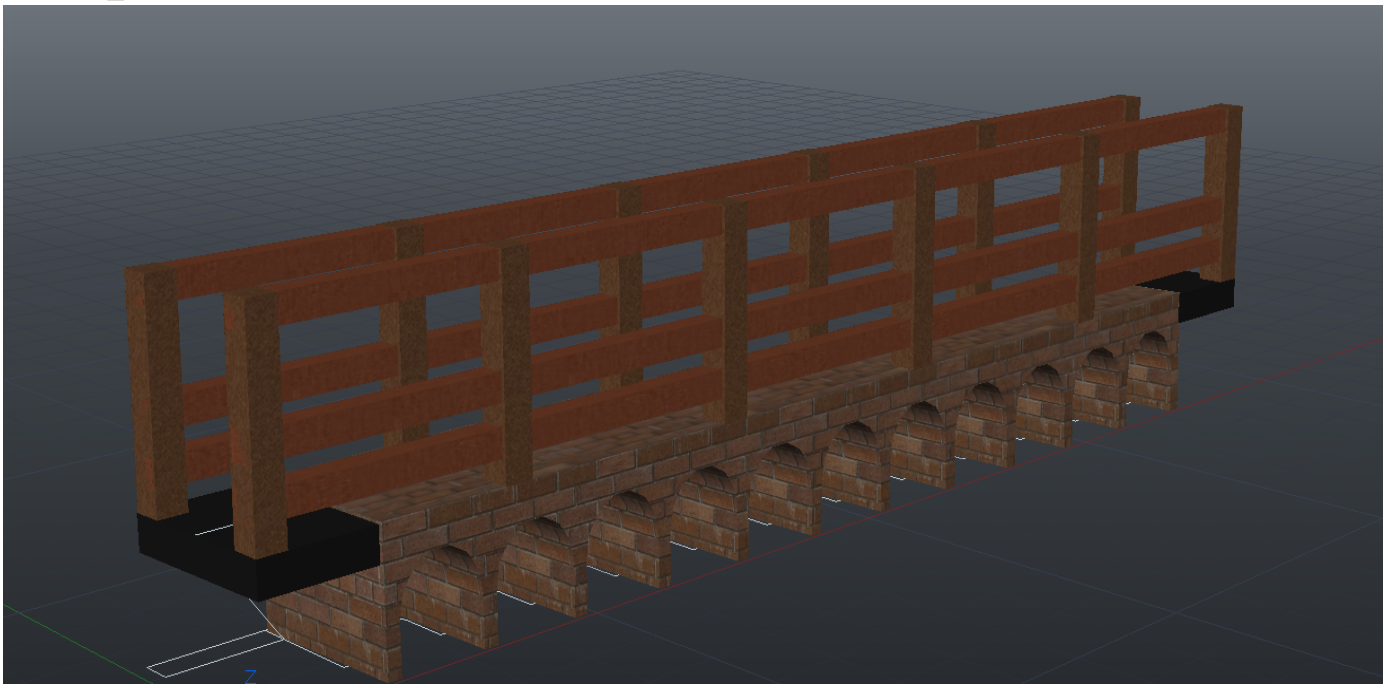


Output :



Chapter 3

Performance Evaluation

3.1 Introduction

Bridges as key elements in the lifeline of each country or urban transportation play a fundamental role economically, politically and militarily. The possibility of severe damage to bridges that are subjected to earthquakes leads to the necessity of seismic evaluation of existing bridges, particularly those which have been either designed regardless of earthquake effects or according to moderate earthquake-resistant consideration. The assessment of safety and stability of these bridges while passing increasingly traffic is of high importance in their seismic performance. In this study, an urban steel bridge in metropolitan Tehran which is accounted for as an important structure in the city transportation is studied using nonlinear static procedure at two hazard levels. The hazard levels were obtained by the use of probabilistic seismic hazard analysis (PSHA). Three-dimensional model of the mentioned bridge is developed and analyzed using nonlinear static procedure (NSP) thus its seismic performance is evaluated accordingly. The results show the vulnerability of this steel bridge during an earthquake and the necessity of retrofitting for improving its seismic behaviour.

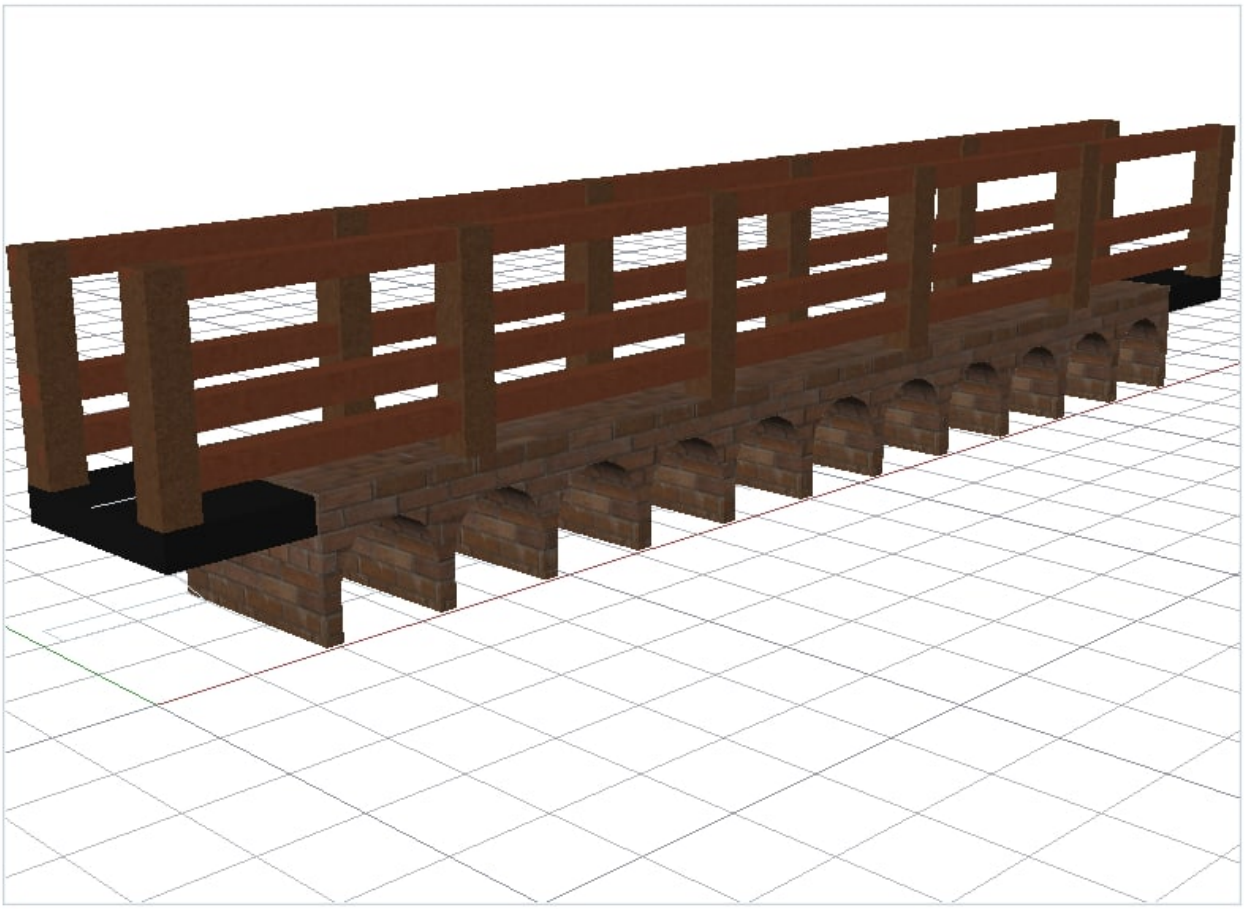
3.2 Simulation Environment/ Simulation Procedure

AutoCAD provides unique drafting tools that are used in drawings of engineering components, designs, and infrastructure. It also minimizes human errors and helps the users to bring their imagination to life with accuracy.

3.3 Basic Data

- Height of our Bridge 20 cm
- Weide of our bridge 30 cm
- The railing of our project is 10 cm.

3.4. Results



3.5.Summary

With so many bridges in need of building, upgrading, updating or replacing, making the bridge design process more efficient, cost effective and collaborative is a priority for civil engineers everywhere.

Chapter 4

Conclusion

4.1 Introduction

Bridges as one of the important man-made structures play a vital role in everyday life of the people of metropolitan city. Serviceability of bridges is of high importance in order to help injured people and required transportation, especially after earthquakes. Strong ground motions in the past decade in the densely populated area had great impacts on many bridges especially those designed according to older codes and demonstrated that these structures are vulnerable. In order to verify current codes which have had great changes compared with old ones and also recognizing of possible deficiencies, the careful study bridge performance in the recent earthquake is necessary. Therefore, it's preferable to investigate the structures that play a main role in everyday life.

4.2 Discussion/ Concluding Remarks

This project may look so easy. Everything was good but when we tried to implement the presspull tool in our project then suddenly we faced some difficulties and our pc got stuck for a while. Also when we tried to sweep tools for railing then we couldn't measure the values. sometimes the values become bigger and sometimes reduce the values. So yes this project was very hard for us.

4.3 Practical Implications

The visual impact of an urban overpass or bridge inserted into a road network requires a careful study of its aesthetic aspect by its engineers. The importance of the aesthetic analysis of the infrastructure design in serving the public good demands special attention because of the densely built‑up nature of the site where it is to be inserted that necessarily calls for order, discipline and aesthetic values . Moreover, it is also important to analyse the environmental impact of a bridge, especially true of urban overpasses with regard to their more intrusive location close to areas of pedestrian use.

4.4 Scope of Future Work

The global population is growing and urbanization — by 2050, there will be around 10 billion people on the planet, according to the United Nations, and 70 percent of those will be living in cities. This means that nations all over the world will have to invest in upgrading existing civil structures as well as building new infrastructure to serve residents in these expanding urban centers. It's estimated that more than 300,000 new bridges need to be built over the next three decades to meet the needs of these new urban dwellers.

References

We took some help from our classmates.

https://www.javatpoint.com/autocad

autocad tutorial