|  |  |
| --- | --- |
| Last Name |  |
| First Name |  |

**Questions regarding Python programming and the algorithm shown in the tutorial.**

A) What are loops useful for? (**max. 15** words!)

...

...

B) How can you get the item with value 7 in L = [[5, 3], [3, -1], [7, 6]]?

...

C) What is this part of the algorithm doing? (**max. 30** words!)

#1.a INPUT LOADS

#input

Lp\_anc=[p1,p2]

Ln\_mag=[n1,n2]

#vector loads

Lv\_load=[]

**for** i **in range** (0,**len**(Lp\_anc)):

v=[0,Ln\_mag[i],0]

Lv\_load.**append**(v)

#LOA (Line Of Action)

Ll\_LOA=[]

**for** i **in range** (0,**len**(Lp\_anc)):

p=rs.**CopyObject**(Lp\_anc[i])

rs.**MoveObject**(p,[0,-10,0])

LOA=rs.**AddLine**(Lp\_anc[i],p)

Ll\_LOA.**append**(LOA)

...

...

...

D) Why X=p at the end of the following piece of code? (**max. 15** words!)

#1.b RESULTANT (FORCE DIAGRAM)

#force diagram load line

Lp\_loadline=[]

Lp\_loadline.**append**(X)

Ll\_loadline=[]

**for** i **in range** (0,**len**(Lv\_load)):

p=rs.**CopyObject**(X,Lv\_load[i])

l=rs.**AddLine**(X,p)

Lp\_loadline.**append**(p)

Ll\_loadline.**append**(l)

X=p

...

...

...

**Task 1**. **Adding more loads**

A) Paste two screenshots of two different funicular structures loaded with nine loads.

|  |  |
| --- | --- |
| screenshot of the Rhino viewport,  showing the form diagram  in **configuration A** | screenshot of the Rhino viewport,  showing the form diagram  in **configuration B** |

B) List the part/s of the algorithm that you have to modify in order to add more loads.

...

...

...

C) What is the main difference between the Grasshopper algorithm of module II and that of the module III? (**max. 30** words!)

...

...

...

**Task 2**. **Removing loads with magnitude zero**

‌

1. Why does the algorithm not work when the external loads have magnitude zero? (**max. 15** words!)

...

B) Paste two screenshots of two different funicular with several external loads with magnitude zero.

|  |  |
| --- | --- |
| screenshot of the Rhino viewport,  showing the form diagram  in **configuration A** | screenshot of the Rhino viewport,  showing the form diagram  in **configuration B** |

**Task 3**. **Asymmetric load**

A) Paste two screenshots of the same funicular structure but with a different position of the asymmetric load.

|  |  |
| --- | --- |
| screenshot of the Rhino viewport,  showing the form diagram  in **configuration A** | screenshot of the Rhino viewport,  showing the form diagram  in **configuration B** |

B) What is the effect of the asymmetric load in the geometry of the structure? (**max. 15** words!)

...

**Task 4**. **Constrained force diagram**

A) List the two constraints that we are taking into account in this exercise.

...

...

B) List the part/s of the algorithm (ex: input loads, resultant…) that you have to modify in order to add the force diagrams constraints.

...

...

...

C) With which geometric element is it possible to find a solution for this task? (**max. 5** words!)

...

D) Paste one screenshot of a structure fulfilling the constraints defined in this task.

|  |  |
| --- | --- |
| screenshot of the Rhino viewport,  showing the **form diagram** | screenshot of the Rhino viewport,  showing the **force diagram** |

**Task 6**. **Golden Gate bridge**

A) Paste screenshots for the following structures

|  |  |
| --- | --- |
| screenshot of the Rhino viewport  showing the **form diagram**  of a cable-stayed bridge | screenshot of the Rhino viewport  showing the **force diagram**  of a cable-stayed bridge |
| screenshot of the Rhino viewport  showing the **form diagram**  of an arched bridge | screenshot of the Rhino viewport  showing the **force diagram**  of an arched bridge |
| screenshot of the Rhino viewport  showing the **form diagram** of a symmetric bridge with only one central support | screenshot of the Rhino viewport  showing the **force diagram** of a symmetric bridge with only one central support |

B) Time for the rarest structures you can find!

Paste two rare yet interesting and meaningful bridge structures in equilibrium.

|  |  |
| --- | --- |
| screenshot of the Rhino viewport  showing the **form diagram**  of configuration A | screenshot of the Rhino viewport  showing the **force diagram**  of configuration A |
| screenshot of the Rhino viewport  showing the **form diagram**  of configuration B | screenshot of the Rhino viewport  showing the **force diagram**  of configuration B |