

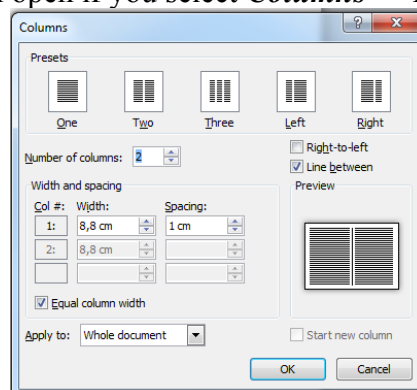
Word processors offer many facilities for making the page layout more flexible and capable of displaying different kinds of information. In the previous exercises there were discussed some ways to format paragraph text and tables. In the following laboratory there will be given general aspects of page formatting.

Exercise 1 - the only exercise, but a very loooooooooong one

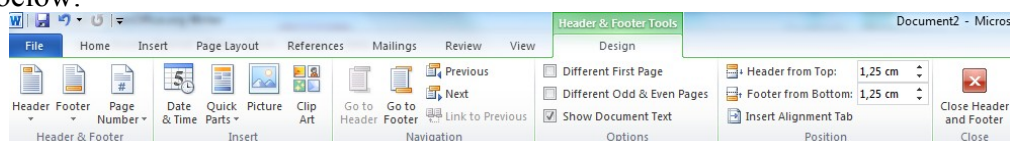
From the **Page Setup** group from the **Page Layout** tab, setup the page dimension to A5 (148 x 210 mm) landscape and the margins to 12 mm each. Ignore MS Word warnings if any. Set the page border so that it looks similar to the example below (**Page Layout** tab then **Page Borders** from **Page Background** group):



Set the column count to 2 equally distributed with 10 mm spacing and a line separator from the **Columns** dialog box that you can open if you select **Columns** → **More Columns...**:

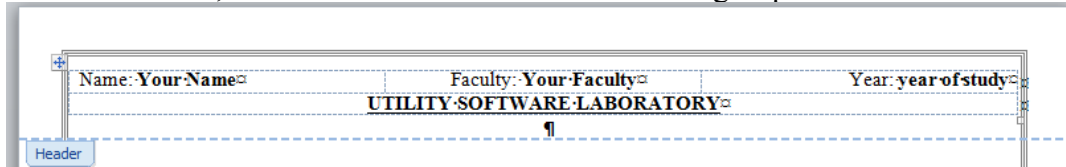


Add a header from the **Insert** tab (**Header** → **Edit Header**). The display of the Design tab changes as shown below:

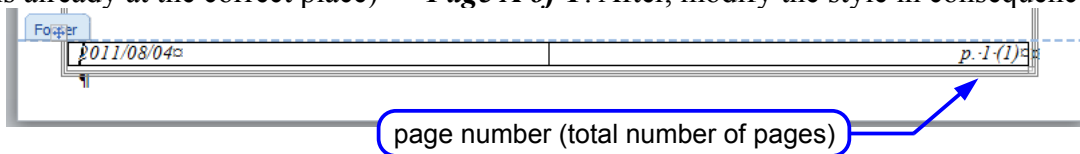



Insert into header a table with no border and add a text as in the picture below (replace the sample

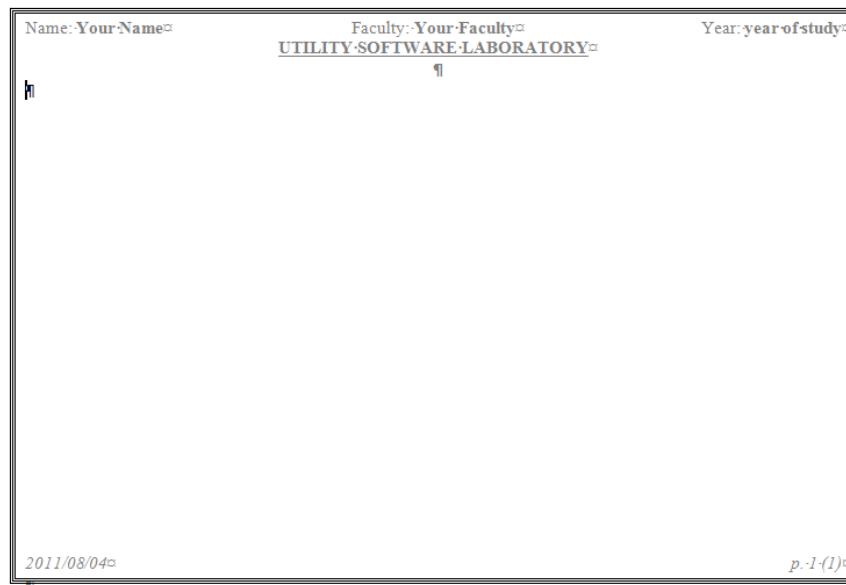
text with your data). To insert the table, simply stay in the editable mode of the Header/Footer, then click on the **Insert** tab and apply instructions from the previous lab (i.e. lab 2a). To see the border line in the editable mode, select **View Gridlines** from the **Table** group:



Go to the footer and in a formatted table add the date and page number(s). For the latter, in the Header and Footer group of the Design tab, select **Page Number** → **Current Position** (if your cursor is already at the correct place) → **Page X of Y**. After, modify the style in consequence:




Choose Times New Roman for the font of the heard/footer. If the header or footer do not seem to match the page layout, fix their respective position from the **Position** group of the **Design** tab. Close the Hear and Footer . The page should look as follows:

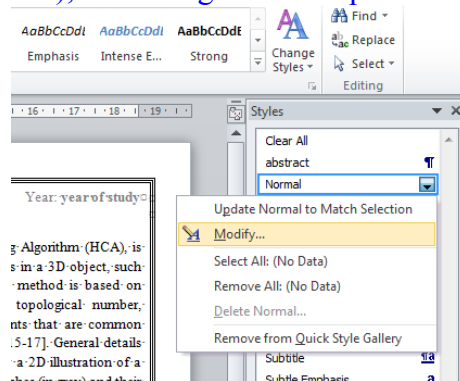


Copy the text from the sample text file and paste it into your document. Format the text as in the given example (The paragraph text is Times New Roman 10, justified, 1.5 cm first line displacement, single line spacing. The heading text is Arial 12, justified, bold, 6 pts spacing before and after).

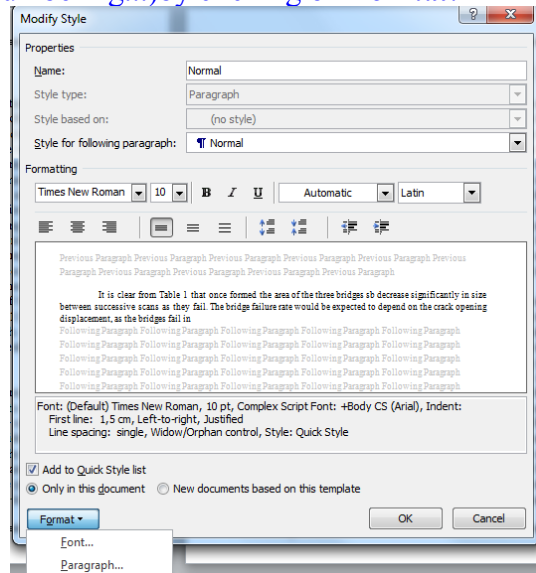
Hints:


1. Title, paragraphs and numbered items (“Section” titles) should be formatted by means of predefined MS Words styles (i.e. Normal and Heading 1), with some font size modifications, paragraph and level numbering where needed. To do so, show the **Style** window by clicking on  in the **Styles** group of the **Home** tab. Put the cursor on a chosen

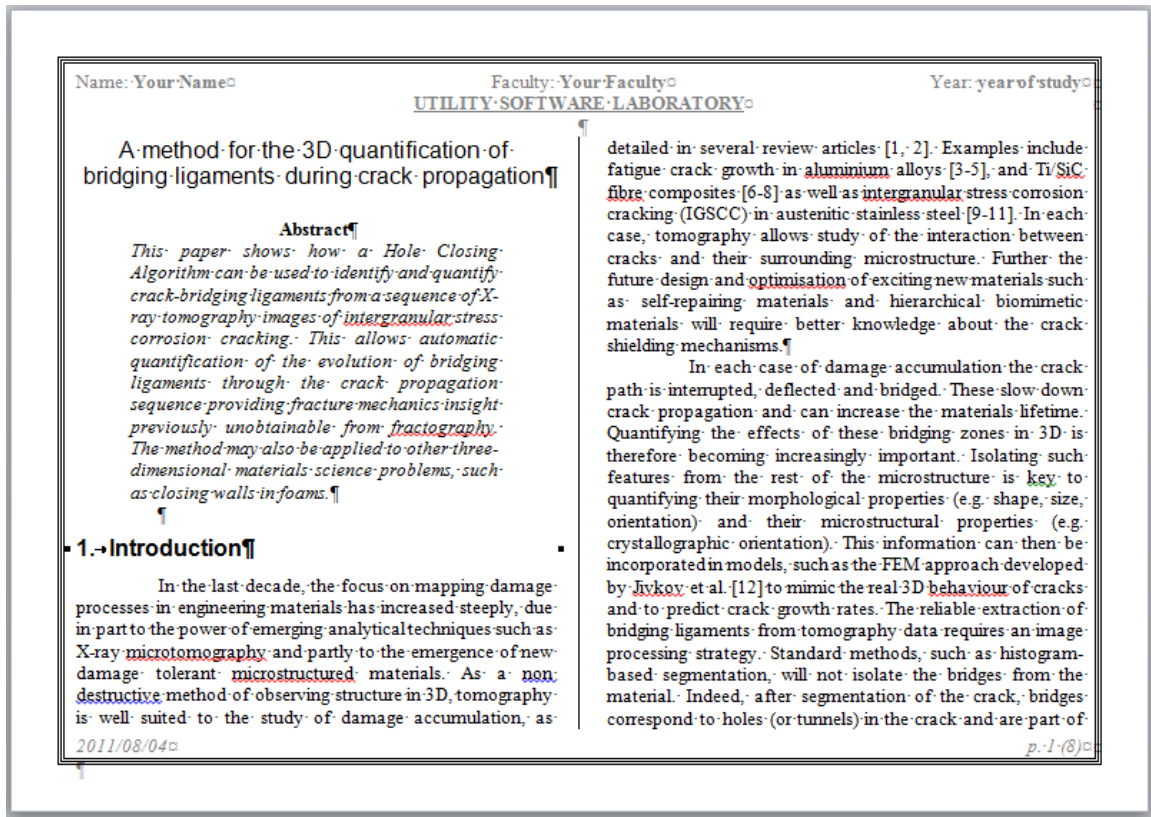
style (for instance *Normal*), it is changed in a drop down list as follows:



Click on *Modify...* to open the *Modify Style* dialog window (see below). Modify in consequence the style to reflect the example below and access the different attributes (eg. Font, paragraph, Numbering...) by clicking on *Format*.



2. Use the bulleting or numbering where required (i.e. Heading 1). This means that section numbers cannot be entered manually (if they are already added to the text prior to formatting, delete them).
3. Remember about paragraph indents and spacings (especially for the abstract formatting). Do not use spaces and end-of-line signs in order to achieve the given result. For the abstract formatting, create a new style. To do so, click on  at the bottom of the *Style* window. Name this new style „*Abstract*” and make the change in consequence as in the example below. **Create also a new style for the references if they exist in your sample text file, based on *Normal* style but with the 2 following attributes: no indentation, no first line displacement.**



When the text is ready, add to the document the images: *lab02b_img1.jpg*, *lab02b_img2.jpg*, *lab02b_img2.jpg*, *lab02b_img4.jpg*.

Hints:

You can do in a few ways. The most common are:

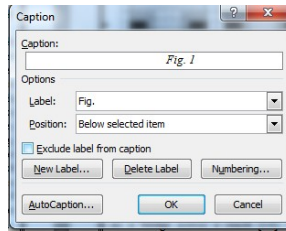
1. Copy the image and paste it in the appropriate place in the document.
2. Drag it and drop in the appropriate place in the document (the picture should be saved to a local drive before).
3. Use **Insert** tab → **Picture** → **From file...** and point the image file you need.

Scale your images so that they fit the column width (by dragging the image sides or corners or the **Format** dialog from the context menu). The all images should be centred. The image placements and captions should be:

Fig. #	Picture	Placement
1	lab02b_img1.jpg	after section 2
2	lab02b_img2.jpg	before 2 nd paragraph, section 3
3	lab02b_img3.jpg	within section 3 (page 5)
4	lab02b_img4.jpg	before section 4

Hints:

1. The image captions should be formatted using MS predefined image caption style. In order to do it, select an image, and insert a caption from context menu or from **References** tab (**Insert Caption** from the **Captions** group).



„Fig.” label does not exist by default. You will have to create it after clicking on **New Label...**

2. After placing the first caption adjust its formatting as in the example (**Caption** style).
3. **OPTIONAL**: figures are usually referenced in the text. Either the reference to a figure can be entered manually or automatically. In the latter case, place the cursor where figure or fig. is mentioned in the text (you can use ctrl+F to search for fig* in the text), select **Cross-reference** from the **Caption** group, and select **Fig.** From the **Reference type** drop-down list. Then select the desired figure and omit to insert the caption text (i.e. Select **Only caption and number** from the **Insert reference to** drop-down list

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the surrounding background. Since algorithms to close holes in 3D objects exist, these may be used to extract bridges. In this paper such methods are extended to quantify bridging ligaments in tomograms of IGSC.

2.- Methodology

Fig. 1. 2D-illustration-HCA.

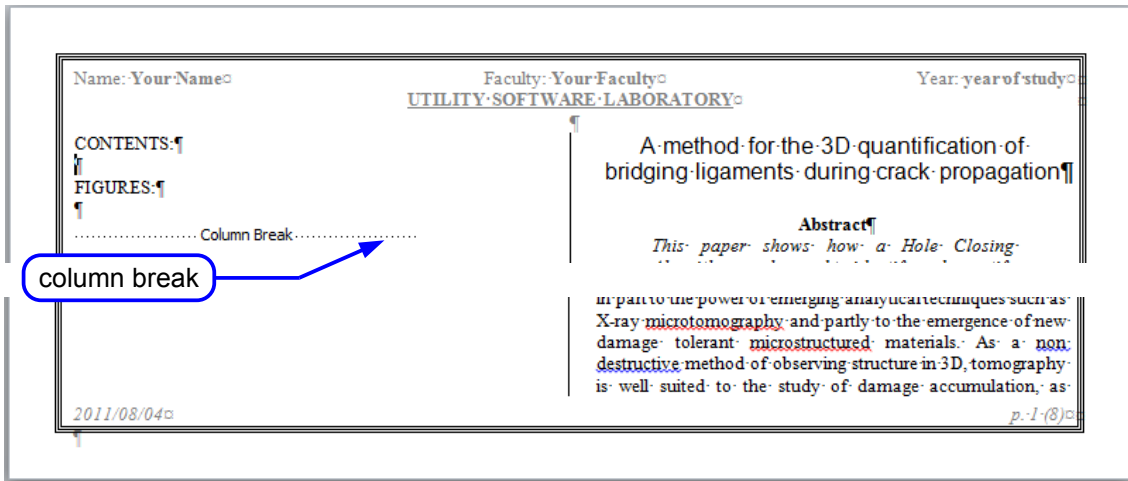
The problem of hole-closing is considered in the literature within the general topic of repairing 3D models. Several methods have been developed recently to correct defects in isosurfaces and 3D meshes, as surveyed in [13]. One approach, called the Hole Closing Algorithm (HCA), is particularly well suited to finding holes in a 3D object, such as concepts used in thinning algorithms [15-17]. General details of HCA are given below, supported by a 2D illustration of a crack shown in Figure 1 with two branches (in grey) and their respective simplified skeleton (in black). HCA considers a bounding box X containing an object of interest OOI (e.g. a portion of a crack containing a bridge as in Figure 1). The method processes the points of X that do not belong to the OOI. Topological number plays a fundamental role in this approach and can be described as follows: it is a calculation of the number of connected components surrounding a particular voxel p in a 3x3x3 cube surrounding p. This number is calculated both for an object O ($T_p(O)$) and the background (or complementary object) B ($T_p(B)$). It is illustrated in Figure 1 where each pixel (or point) in the images, excluding those of the skeleton, is represented by the corresponding topological numbers with the following notation: $T_p(D)$, where D is the squared Euclidean distance from the closest point of the OOI (here the skeleton). It should be noted:

- points that have $T_p(B) = 0$ are called interior points since they have no connection to the background. If an interior point is deleted, it leaves a cavity in the object.
- a point on a line is a 1D-isthmus while an interior point on a plane is a 2D-isthmus, these have $T_p(O)$ larger than 2 and $T_p(B)$ larger than 2, respectively. In other words, if a 1D-isthmus is deleted, it cuts a line into two parts. If a 2D-isthmus is withdrawn, it merges locally at least two connected components of the background.

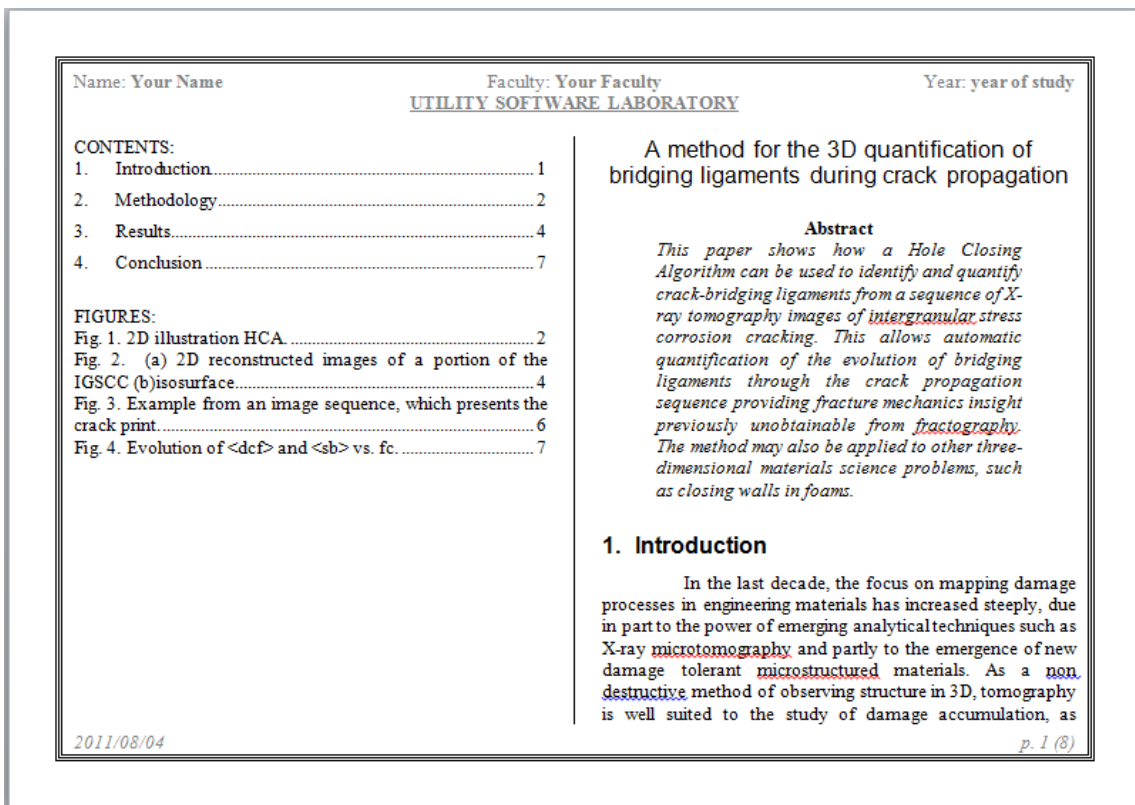
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List Paragraph style: indent 0.5 cm before and 0.4 cm hanging

Go to the beginning of the document. Place the cursor just before the title. Add the column break (from **Page Layout** tab in the **Page Setup** group, select **Break** → **Column** or press **Shift+Ctrl+Enter**). Place the headings for the contents index and the figures index.



After each heading (from the *Reference* menu) add the appropriate indices (*Table of contents* and *Table of figures*).



Hint:

Each index should be manually refreshed every time the document contents changes (from the context menu item **Update field**).

Finally, format the tables styles (as ordinary paragraph text), for example as shown below:

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<p>CONTENTS:</p> <p>1. Introduction..... 1</p> <p>2. Methodology..... 2</p> <p>3. Results..... 4</p> <p>4. Conclusion..... 7</p> <p>FIGURES:</p> <p>Fig. 1. 2D illustration HCA. 2</p> <p>Fig. 2. (a) 2D reconstructed images of a portion of the IGSCC (b) isosurface 4</p> <p>Fig. 3. Example from an image sequence, which presents the crack print. 6</p> <p>Fig. 4. Evolution of $\langle dcf \rangle$ and $\langle sb \rangle$ vs. fc. . 7</p>	<p style="text-align: center;">A method for the 3D quantification of bridging ligaments during crack propagation</p> <p style="text-align: center;">Abstract</p> <p><i>This paper shows how a Hole Closing Algorithm can be used to identify and quantify crack-bridging ligaments from a sequence of X-ray tomography images of intergranular stress corrosion cracking. This allows automatic quantification of the evolution of bridging ligaments through the crack propagation sequence providing fracture mechanics insight previously unobtainable from fractography. The method may also be applied to other three-dimensional materials science problems, such as closing walls in foams.</i></p> <p>1. Introduction</p> <p>In the last decade, the focus on mapping damage processes in engineering materials has increased steeply, due in part to the power of emerging analytical techniques such as X-ray microtomography and partly to the emergence of new damage tolerant microstructured materials. As a non-destructive method of observing structure in 3D, tomography is well suited to the study of damage accumulation, as</p>	
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