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| Hibernia College Planning Form |
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**Session Planning Form**

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| Tutor name: | Kevin O’Brien | | | |
| Delivery date: |  | | | |
| Module title:   |  | | --- | |  | | Mathematics for Computing | | | |
| Session title: | Trees | | **Session no.** | 8 |
| Prepare | | | | |
| Session study content: | Chapter 3 of study guide 2. | | | |
| Essential readings: | This exercise requires a full understanding of material covered in “Trees” (Chapter 3 of Book 2) | | | |
| Study aims and learning outcomes: | The quiz/knowledge check questions should focus on determining how well the students succeeded in achieving the study aims and learning outcomes. | | | |
| In this part of the session, students will study the relevant chapter(s) in the University of London study guide and read the essential readings for the chapter(s). When they have completed this, they will complete the end-of-session quiz to see how well they know the session content.  If there are any further readings, resources or web sites that you feel would be useful to students for studying this session, please add them in the next row. | | | | |
| Additional resources | None | None | | |
| Test yourself | Provide multiple-choice questions that test students on the core session content.  Fill in the quiz template at the end of this document with questions and constructive feedback. | | | |
| Evaluate | | | | |
| In this part of the session, students will engage with tasks and activities that will enable them to evaluate and analyse the session content they have studied.  When developing tasks and activities, think about how you intend for the student to achieve each one – this may be through discussing concepts on a forum, contributing to a wiki , conducting some online research, analysing a case study, studying a video, etc.  Discuss your ideas with the Knowledge Officer who will know the full range of options available and advise on which is most appropriate.  Note: You do not need to provide a task for each of the headings below. The task that you provide will depend on the session content and the workload for the student in that session. Select the most appropriate task(s) based on the session content. | | | | |
| Discuss | ~~Provide a question based on the session content that will generate a discussion on the tutor-moderated forum.~~ | | | |
| Solve | Design a problem-solving exercise or worksheet based on the session content that the students will complete. | | | |
| Research | ~~Ask the student to conduct online research into important areas of the session content such as useful examples or further explanation of the content. The findings could then be shared on a forum/wiki/blog.~~ | | | |
| Assess | | | | |
| Note: The activities in this part of the session will be linked to the synchronous online tutorial and the onsite days. The activities for each session will depend on the scheduling of the tutorials and onsites in the module calendar. These activities will be completed over a number of sessions.  Ideally, the activities in this part of the session should link together and be developed over a number of sessions. | | | | |
| Submit | Prepare an activity/task (for example, answering exam questions) for the students and ask them to submit their responses to the tutor prior to an online tutorial or onsite – this submission could then form the basis of the tutorial/onsite discussion.  The activity/task should be based on the content that they have covered in the sessions prior to the online tutorial or onsite. | | | |
| ***Students attempt end of chapter revision questions from the study guide*** | | | |
| Apply your knowledge | In the online tutorial and onsite day, build on the activity/task that students have prepared and submitted. Students could work together in groups to discuss and solve a problem.  A selection of students should be asked to present their submission in each online tutorial or onsite. This would be a different group of students for each tutorials and onsite so every student gets an opportunity to present. | | | |
| ***Not applicable*** | | | |

## Quiz template

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| Session title: | Trees | | Session no. | 8 |
| Test yourself:  Each session should have a minimum of 20 questions in total.  What content is tested will depend on the chapter(s) content – some parts may require more questions than others to test the student.  These questions will be used to test students' knowledge and help them to recall the academic content of the chapter(s).  Constructive feedback should be provided for each question to reinforce the learning for the session. | | | | |
| **Question 1**  **What is a binary tree: A tree is a connected graph without paths .**   * **True** * **False** | | Question 2  Let T be a tree with at least two vertices. Then T has at least two vertices of degree one.   * True * False | | |
| **Feedback: False: It is a connected graph without cycles.** | | Feedback: True | | |
| **Question 3**  **Internal nodes have no children nodes.**   * **True** * **False** | | Question 4  It is possible to construct a tree with degree sequence  ***4, 3, 3, 1, 1***.   * True * False | | |
| **Feedback: False . External Nodes have no children nodes** | | Feedback: A tree with 5 vertices would have 4 edges not 6. | | |
| **Question 5**  **Let T be a tree with n vertices. Then T has n-1 edges.**   * **TRUE** * **FALSE** | | Question 6  A balanced binary tree has i2 nodes on level i (apart from the highest level).   * TRUE * FALSE | | |
| **Feedback :True** | | Feedback: False A balanced binary tree has 2i nodes | | |
| **Question 7**  **It is possible to construct a tree with degree sequence**  **4, 3, 2, 2, 1.**   * **TRUE** * **FALSE** | | Question 8  A rooted tree is a tree with a countable number of nodes, in which a particular node, called the root, is distinguished from the others, and used to represent the start of a process.   * TRUE * FALSE | | |
| **Feedback : False – it needs two vertices of degree 1** | | Feedback : True | | |
| **Question 9**  **Let T denote a tree with at least two vertices. Then there is exactly one path connecting any pair of vertices in T.**   * **TRUE** * **FALSE** | | Question 10  It is possible to construct a tree with degree sequence  ***3, 1, 1, 1.***   * TRUE * FALSE | | |
| **Feedback : True** | | Feedback: True. There are three edges connecting 4 vertices. Also there are no cycle. | | |
| **Question 11 A tree has 12 vertices. How many edges are there in the tree.**  **A. 12**  **B. 10**  **C. 11**  **D. 14** | | Question 12 A binary search tree is balanced.   * True * False | | |
| Feedback: Correct Answer is C. | | Feedback: True (see lemma. 3.7 in study guide) | | |
| Question 13: Let T denote a tree with at least two vertices. There is exactly one path connecting each pair of vertices of T.   * True * False | | Question 14 The graph depicting in figure 1 is a spanning tree of figure 2.   |  |  | | --- | --- | | Figure 1 | Figure 2 |  * True * False | | |
| Feedback : True . See Lemma 3.4 in study guide. | | Feedback : False. It is not a tree, hence not a spanning tree. | | |
| Question 15  A binary tree is a rooted tree with each internal node containing two children.   * True * False | | Question 16  What is the maximum number of comparisons that would have to be made in order to locate an existing record from the list of 10000?  A. 12  B. 10  C. 11  D. 14 | | |
| Feedback: True | | Feedback : Correct Answer D | | |
| Question 17  Let H be a subgraph of a graph G. For H to be a spanning tree of G, it would have to be a tree and have all the vertices of G.   * True * False | | Question 18 The height h of a binary tree with N records stored at internal nodes is given by the formula:     * True * False | | |
| Feedback: TRUE | | Feedback: True | | |
| Question 19  The minimum number of comparisons needed in order to find an existing record in the tree is equivalent to the height of the tree.   * True * False | | Question 20  A binary search tree is designed to store an ordered list of 3000 records at its internal nodes. What is the maximum number of comparisons needed in order to find an existing record in the tree?  A. 10  B. 12  C. 11  D. 14 | | |
| Feedback: False The height is equivalent to the maximum number. | | Feedback : Correct Answer B | | |