Department of Computer Science University of Bristol

COMS21103: Data Structures and Algorithms
Coursework 2: Create an E-Lesson Explaining an Algorithm

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This coursework involves creating an online video lesson explaining an algorithm. The submission will be via SAFE.

The deadline for algorithm assignment is **Tuesday 15 December 2015** at **16:00pm**.
The submission deadline is **Tuesday 12 January 2016** at **23:59pm**.

In this coursework you will work in groups of two, of your own choice. The work which you submit should be your own, properly referenced if needed according to the university's regulations. The standard Faculty of Engineering penalties apply for late submissions. The coursework is worth 10% of the overall mark of the unit. It is marked out of 10.

1 Create the Video Lesson

In this part, you will work in groups of two to create a lesson for one of the following three algorithms

- Dantzig's Simplex algorithm
- The Hopcroft-Karp algorithm
- The Munkres assignment algorithm

1.1 Algorithm Assignment

This step aims to get an equal number of assignments to each of the three algorithms above, but also gives you the chance to choose an algorithm of your preference. **The algorithm assignment will be done on first-come-first-serve basis**. To be assigned an algorithm, you should first choose your working partner. Together, go to the school office (MVB 2.19) during working hours (9:30am-4:00pm) and enter your names and CS usernames into an available slot for the algorithm you've chosen. Given the number of students registered for the module (132), there will be 22 maximum assignments for each algorithm.

Notice that:

- Working pairs and assigned algorithms cannot be swapped/changed once you make your choice.

- Do not start working on an algorithm until you record your preference in the school office.
- Failure to register your working pair and algorithm choice **before Tuesday 15th of December 2015** will result in a grade of 0 for the coursework.

1.2 Creating Your Video Lesson

You are expected to design and produce a lesson to explain the assigned algorithm. The lesson should cover:

- The problem that the algorithm attempts to solve
- An explanation of the algorithm
- At least one example being solved using the algorithm
- A mention and short explanation of the computational complexity of the algorithm (no proof required).

In preparing your lesson, the following should be carefully considered:

- The only acceptable format is a video (to be uploaded to YouTube). **Audio recording is mandatory, you should explain the algorithm aloud in the video**.
- The voice of one or both students in the working pair should be used in creating the video.
- The learner should not spend more than 10 minutes following your lesson. **Lessons longer than 10 minutes, even if by a second, will not be marked**.
- You can assume the learner is familiar with programming, algorithms and the Big-O notation in general, but not with your assigned algorithm.
- You may choose any form of visuals in your video, such as slides, hand-written content, or even a video of yourself explaining the algorithm on a white board.
- Using material (slides/figures) from the lecture slides or from other resources is allowed, and should be referenced **in the Notes section of the Youtube submission**.
- You should avoid using any copyrighted material without permission. YouTube would remove any video that contains copyrighted material including images and audio. If your video is removed for copyright infringement before it is marked, you will receive a grade of 0, and will not be allowed to resubmit.
- Using material prepared by a colleague in the class is not allowed, and would be marked as 0 [even if correctly referenced!]
- You are not allowed to use any of the examples presented in the lecture or the problem class. A different example should be proposed and solved.

You can be as innovative as you like in how you prepare your lesson, some alternatives are [again, this should not be a limiting list of options in any way]:

1. You can create some slides using powerpoint (Office 2010 or later), add voice recording and timing, and directly convert the presentation into a .wmv video.

2. You can video capture your screen, as you're going through the slides alongside audio recording.

3. You can place a webcam looking down at a desk, and explain the algorithm on a sheet of paper.

1.3 Submitting your lesson

You should upload your video to **YouTube**. Any other website for video uploads would not be accepted. Keep your video publicly available, no passwords or private viewing please. You may disable comments on your video if you wish. You may use your own Google account, or create a new YouTube account for this task. The upload date on the YouTube video should not exceed the deadline for the submission. **If you upload a new version of the video after the deadline, this will be considered a late submission and would be penalised according to the Faculty of Engineering regulations.**

Using SAFE, submit a **.pdf** file of the following format - **Both students should submit the same .pdf file**:

Student1 name, Student1 CS username Student2 name, Student2 CS username Algorithm name clickable URL — i.e. By clicking here, the marker would open the YouTube page directly Lessons Learnt: – a maximum of 3 lines on what you learnt from this coursework Challenges: – a maximum of 3 lines on obstacles you faced while working on this coursework Notes: – other notes you wish to report (FAQ - Q4)

2 Marking Criteria

The lesson will be assessed out of 10 as follows:

1. Problem explanation [2 marks]

   - 0- the problem the algorithm attempts to solve is not explained, or explained incorrectly
   - 1- the problem the algorithm attempts to solve is explained partially
   - 2- the problem the algorithm attempts to solve is explained fully, including any assumptions and out of scope cases

2. Psuedocode or algorithm explanation [4 marks]

   - 0 - algorithm is difficult to understand - the explanation is insufficient or not clear. This includes the case of any technical difficulties like a very low audio or a very dark video.
   - 1- Some of the algorithm can be understood by the learner

- 2- Most of the algorithm can be understood by the learner with ease
- 3- Very good lesson explaining the concepts and the algorithm
- 4- Excellent world-class lesson - enjoyable, easy to follow and can be used (as is) to teach new students [only 2 of the 22 lessons for each algorithm will be given 4/4]

3. Chosen example [3 marks]

   - 0- no example provided/solved within the lesson
   - 1- simple example chosen that does not fully reflect the strength of the algorithm
   - 2- good choice of example(s), clearly explained
   - 3- excellent choice of example, challenging example yet easy to follow and the listener feels confident to replicate the solution

4. Computational complexity discussion [1 mark]

   - 0- Computational complexity discussion incorrect or incomplete
   - 1- Computational complexity discussion correct and complete

3 FAQs

1. Can I change my working partner or the chosen algorithm after the algorithm assignment?
   No. Algorithm assignment cannot be modified or exchanged. Changing the working pairs is not allowed either.

2. What do I do if I cannot find a person to work with?
   You can use the discussion board on blackboard, or ask around in the lecture.

3. Can we work in groups of three?
   No. Groups of exactly two students are only permitted.

4. What if my assignment partner never shows up or does not help in preparing the lesson?
   Discuss how you will work together (best way to get in touch, availability, etc) as early as possible. If this does not work out, submit the assignment on your own detailing what happened in the notes of the .pdf file (Section 1.3). Your assignment partner not being in touch is NOT an acceptable excuse for getting an extension. You will still be expected to submit your assignment on time.

5. What if my assignment partner has a valid reason for getting an extension?
   Get in touch via email (Dima.Damen@bristol.ac.uk) as soon as a situation arises. Make sure you submit your assignment on time regardless of your partner's situation.

6. Can I get extra marks because I ended up working alone?
   No. If you created the lesson without any help from your assignment partner, you will still be graded in the same way as people working in pairs. This will not be considered in deciding the mark.

7. How should I and my working partner divide the work?
   This is completely up to you.

8. Ten minutes are not long enough for me to explain the algorithm, what should I do?
   Conciseness and focusing on the most important aspects of the algorithm is part of the coursework's goals. Think about that when designing your lesson, and selecting the example you wish to solve. Choosing a lengthy example, for instance, would not be helpful to fitting your lesson within the time limit. You could choose a shorter example that focuses on the strengths (or weaknesses) of the algorithm.

9. I only have a poor quality camera, and a cheap microphone. Would the sound or video quality affect my grade?
   No. The video will not be assessed by the recording quality, as long as the marker can see and hear what you are describing in the video.

10. Should I create fancy animations to get a good mark in this coursework?
    No. Read the marking criteria in Section 2. Your lesson will be assessed by the clarity and depth of your explanation. Using animations is helpful in explaining in general, but an equally good lesson could be achieved with just a pen and a paper.

11. I keep making mistakes during recording. Can I edit my video?
    Of course. Feel free to record your video as separate parts then stitch them together. Notice that it is very difficult to get it done from the first recording. You might need to do a mock trial before you record yourself.

12. Can someone else record the audio for me?
    No. Either you or your assignment partner (or both of you) should do the audio explanation yourselves. If you have any issues with this, please get in touch NOW.