



**Northumbria
University**
NEWCASTLE

COURSEWORK ASSESSMENT SPECIFICATION

Module Title:	Program design and development
Module Number:	KF5008
Module Tutor Name(s):	Nick Dalton, Mark Hurrell
Academic Year:	2019-2020– Semester One
% Weighting (to overall module):	40%
Coursework Title:	Assignment 2 - Personal
Average Study Time Required by Student:	

Comment [GE1]: Should be 40 if the 2nd assessment is 60?

Dates and Mechanisms for Assessment Submission and Feedback

Date of Handout to Students: 7 th October 2019
Mechanism for Handout to Students: eLP
Date and Time of Submission by Student: 20th December 2019 1:30 PM (lunch time)
Mechanism for Submission of Work by Student: Electronic submission via Blackboard/Demonstration in workshop class. Date by which Work, Feedback and Marks will be returned to Students: Feb 3rd 2020 (20 working days) Date by which corrections/queries should be sent back Feb 14 th : 13:30
Mechanism for return of assignment work, feedback and marks to students: feedback will be given as the assessment is marked in the final lab, marks on ELP

Comment [GE2]: Wrong date

Comment [GE3]: Wrong date

Further Information

Learning Outcomes tested in this assessment

Comment [GE4]: These are the same as for assessment 2. Is that correct?

Knowledge & Understanding:

Analyse a problem, produce an object-oriented design for its solution and evaluate the object-oriented design documentation

Intellectual / Professional skills & abilities:

- Decompose simple designs into a series of steps executable by a machine

Personal Values Attributes (Global / Cultural awareness, Ethics, Curiosity) (PVA):

- To be able to look critically at technology and how it effects wider society.

Background

Many parents worry that their children do not do enough physical activity. The press often carry scare stories regarding rising levels of childhood obesity as well as how social skills will be important in the future economy. These scare stories often state that children who engage in sports from a young age are more likely to be successful, happy and healthy. Many parents feel that they have little choice other than to force their children to do extra-curriculum spots, such as swimming, football, dancing, kickboxing, and gymnastics.

The system you are to design manages the subscription and attendance of an after school gymnastics club located in Northumberland.

The system you need to model is based on a real scenario, there is some simplification and changes as the real system is a paper based system.

The club offers classes on four days a week days and time are listed in the tables below, there are different classes depending on age and ability. The club has a good reputation and there is currently a waiting list for most of but not all classes. Waiting lists are a problem that the system must solve, see below for more details.

Class Timetable

Mondays and Wednesdays

Time	Approximate Age	Ability
16:00 – 17:00	4 - 7	Level 0 - 2
17:00 – 18:00	7 – 10	Level 2 - 3
18:00 – 19:00	10 - 16	Level 3+

Fridays

Time	Approximate Age	Ability
16:00 – 17:00	4 - 7	Level 0 - 2
17:00 – 18:00	4 – 7	Level 0 – 2
18:00 – 19:00	7 – 10	Level 2 – 3

Saturday

Time	Approximate Age	Ability
10:00 – 11:00	4 - 7	Level 0 - 2
11:00 – 12:00	7 – 10	Level 2 - 3
12:00 – 13:00	10 - 16	Level 3+

Class sizes are set to be a maximum of 30.

Taster sessions and membership commitment.

- There are waiting list for most of but not all classes.
- The club requires payment for a two month block as they only go through the payment cycle and allocation cycle once every two months.
- New children are given two free sessions on consecutive weeks.
 - This is before they have to make a financial commitment paying for a two month block.
 - If the new child wants to join the club.

- The remaining sessions of the payment cycle are billed pro-rata. so that they pay a maximum of six out of eight weeks for their first membership payment.
- For example if a normal child is paying £40 for two months, a new child would not have to pay for the two free taster sessions and only pay £30 (or £35 if they only did one free taster session).
- If in this time the child decides they do not wish to continue then the next child on the waiting list is offered the same two week trial period.
 - This is followed by the same pro-rata payment as for the weeks remaining in the billing cycle. For example if only one trial week is left then the child who wishes to continue will pay £30 and the previous child who rejected it pays nothing.
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- A few of the classes do not have a waiting list, therefore a parent making an enquiry may offered the two free sessions at any point during the billing period.

Waiting list

Most classes are already full.

- As already discussed when a parent makes an enquiry they most often end up on a waiting list rather than being offered a taster session,
- Each class maintains its own waiting list. When a parent makes an enquiry they are added to any waiting lists which are relevant to them, for example if the parent can only take their child to a Friday and Saturday class then they will be added to these classes waiting list but not any that they cannot attend.
- When a place is offered and accepted it is normally the case that the parent/child is removed from any other class waiting lists as they now have a place.
- However, a parent may still ask to stay on the other class's waiting list if they wish to swap classes when a place becomes available.
- The system must be able to allow for a parent to have more than one child.

Membership and payment cycle

When a child becomes a member details about the child need to be held such as name, date of birth and any medical conditions. When they are no longer members this information is sanitized by zeroing out attributes which are personal in nature. If the parent has other children who are attending then the parents details are not sanitized, however if the parent has no other children their personal information is also sanitized with the exception of their name and email address. Information about the parent such as name, address and most importantly email and telephone number is stored. This information is used to remind parents when fees are payable.

Fees are payable in advance and are paid in full for two months of classes. If a child stops attending there are no refunds for the unused sessions, and the space in the class is not filled until the end of the pre-paid sessions. If a child has prepaid for the next payment cycle but cancels their membership before the start of the prepaid period they can get a full refund.

Four weeks before the fees are due, a printed sheet (letter) is given to each parent when they drop their child off at club. This has details regarding the payment including the last day it must be paid by and consequences of not paying on time. The class attendance record is used to identify parents who did not drop their child off and therefore did not get the payment reminder letter. An SMS is sent to these parents with the reminder.

A check is made two weeks prior to the end of the billing cycle to identify anyone who has not yet paid. A final SMS and email are sent to the parents restating the date that the fees must be paid by. If the fees are not paid one week in advance (end of the billing cycle) of the next membership period, the child loses their place and a place can be offered to someone on the waiting list.

Allocating from the waiting list

Once the payment deadline has passed, all those who have not paid on time are removed from the class registers. These free spaces need to be allocated to new children where possible. It can sometimes be difficult to contact parents are they are working or busy therefore a SMS message has been composed which offers a place in a class and also contains a deadline of 24 hours to

respond. The spaces are offered purely based on a queue. If a parent responds and says they are no longer interested then all the data and their place in the list is removed. If no response has been made after twenty-four hours the place is offered to the next available student. However a unresponsive parent is not initially removed from the list and they have not lost their place at the top of the list; however they will not be considered again in this billing cycle. If a parent has been contacted twice (two separate billing cycles) and there has not been a response from them, then they are removed from the waiting list. For example John has a child Mary. John puts Mary on the waiting list for Saturday Kickboxing. This is followed by Kayla who has a child Jenny, and Parent Ricky who has Keiv. The Waiting list is (John, Kayla, Ricky). John is contacted but is very very busy answering email. So Kayla is offered a place leaving the list as John, Ricky

Attendance

Attendance is monitored; a class list is generated before the beginning of class. At the start of the class those who attend are ticked off the list and the date data is then fed into the system at some point in the week.

Assessment Tasks

1. Develop the Design Class Diagram for the system. You should follow sound design principles when creating the class diagram. The diagram should also be consistent with the sequence diagrams
 - a. [20 Marks]
2. Develop the Sequence Diagrams for the membership and payment cycles.
 - a. [20 marks]
3. Evaluate your class diagram, explain elements which you think are good practice and identify anything you think are weaknesses in the design. You should consider OO Design principles when evaluating this diagram. Approximately 700 words
 - a. [30 marks]
4. Research question, you are required to carry out some research. It is important that you use a range of quality sources and your findings and conclusions must be supported by the literature. The mark you are awarded is based on the quality of the research carried out, and principle conclusion you have drawn from the research you have conducted. The task is "Discuss the need for automated testing in an agile development". You need to look at what benefits automated testing has, what considerations much be made when constructing the code to maximize the benefit from testing. What disadvantages are there to testing in an agile environment such as one where you may have code refactoring? Approximately 700 words
 - a. [30 marks]

Place all of these diagrams and questions in a single Word document for upload.

Rubric

Class Diagram

Grade	Description
19-20	Demonstration of an Exceptional design level class diagram. The diagram contains no technical flaws, and shows Exceptional application of design knowledge in creating a solution to fully realise the scenario.
17-18	Demonstration of an outstanding design level class diagram, which exhibits only small flaws. The diagram may have a class with too many responsibilities or a direction of the dependency may be incorrectly shown in one dependency. The diagram is almost perfect but does exhibit a very small number of issues.
15-16	Demonstration of an Excellent design level class diagram, which exhibits some flaws. The diagram may have a class with too many responsibilities or a direction of the dependency may be incorrectly shown in one dependency.
13-14	Good to Very Good, work exhibits a strong understanding of the underlying principles in creation of a design level class diagram, however it does exhibit a number of deficiencies and may not be a good match to the sequence diagram.

11-12	Satisfactory, work exhibits an understanding of the underlying principles in creation of a design level class diagram. However the diagram contains a moderate level of design deficiencies.
9-10	Fair but weak, The diagram submitted contains flaws in understanding. Some attempt has been made in relation to creating a design level diagram however there are missing elements.
6-8	Weak Unsatisfactory Design class diagram. The diagram submitted contains significant flaws in understanding. Diagram submitted is not design level but analysis level diagram with many of the required classes but missing design principle. Class diagram does not contain the methods needed to implement the required functionality.
0-5	Incomplete and/or Irrelevant. The diagram supplied is not a design class diagram or is a design class diagram which exhibits significant technical problems such as a lack of dependencies, missing classes.

Sequence Diagram

Grade	Description
19-20	Demonstration of an Exceptional sequence diagram. The diagram contains no technical flaws, and shows Exceptional application of design knowledge in creating a solution to fully realise the scenario.
17-18	Demonstration of an outstanding sequence diagram, which exhibits only very minor flaws. The diagram should encompass the full solution but may miss a single element such as an iteration of alternative path. The diagram is almost perfect but does exhibit a very small number of issues.
15-16	Demonstration of an Excellent sequence diagram, which exhibits only small flaws. The diagram may have small issues with syntax, or may have failed to implement small element of the scenario.
13-14	Good to Very Good, work exhibits a strong understanding of the underlying principles in creation of a sequence diagram, however it does exhibit a number of deficiencies and may not be a good match to the class diagram or scenario in places.
11-12	Satisfactory, work exhibits an understanding of the underlying principles in creation of a sequence diagram. However the diagram contains a moderate level of design deficiencies, or fails to understand the detail required such as loop to iterate until an element is found.
9-10	Fair but weak, The diagram submitted contains flaws in understanding. Some attempt has been made in relation to creating a sequence diagram however there are missing elements and/or the diagram is too high level to correctly inform the class diagram.
6-8	Weak Unsatisfactory sequence diagram. The diagram submitted contains significant flaws in understanding. The sequence diagram fails to capture elements from the scenario.
0-5	Incomplete and/or Irrelevant. The diagram supplied is not a sequence diagram or the diagram fails to contain the technical syntax needed to support the scenario.

Evaluation of Class Diagram

Grade	Description
27-30	Demonstration of an Exceptional evaluation of the design and have provided a thorough and complete evaluation of the diagram including design principles taken into account in taken and those which there not, explaining clearly why. The evaluation should be balanced, critical and self-reflective.
24-26	Demonstration of an outstanding evaluation of the design and have provided a thorough and complete evaluation of the diagram including approaches taken and those which there not. The evaluation should be balanced, critical and self-reflective but may contain a small omissions such a incomplete explanation of rational.
21-23	Demonstration of an excellent evaluation of the design and have provided a complete evaluation of the diagram may be weaker in some aspects such as critical evaluation. The evaluation should be balanced, critical and self-reflective.

18-20	Good to Very Good, work exhibits a strong understanding of the underlying design principles. However it does exhibit a number of deficiencies for example it may fail to fully explain the reasons for an approach or to be critically objective regarding short coming the work.
15-17	Satisfactory, work exhibits an understanding of the underlying design principles. However the work contains demonstrates a lack of depth in understanding in some areas of the design principles and/or fails to critically examine the work undertaken.
12-14	Fair but weak, The evaluation exhibits flaws and/or omissions. Some or not all of the design principles have been correctly applied to the work.
9-11	Weak Unsatisfactory evaluation. The evaluation contains significant flaws or is missing many of the design principles needed in evaluation of the work undertaken.
0-8	Incomplete and/or Irrelevant. Evaluation is missing or fails to address the question.

Research Question

Grade	Description
27-30	Demonstration of an Exceptional answer to the question, work contains sufficient high quality sources of information which are correctly referenced in the Harvard style. Work should contain no unsupported statements. Answer is near perfect with a detailed and balanced argument and an exceptional conclusion.
24-26	Demonstration of an outstanding answer to the question, work contains no major flaws with only major issues with unsupported statements. High quality sources of information which is correctly referenced in the Harvard style. The answer should be detailed and concise, work should reflect a balanced and objective approach and with an outstanding conclusion.
21-23	Demonstration of an Excellent outstanding answer to the question, majority of the important statements should be supported with references to high quality academic sources. The answer should be detailed and concise, and balanced there may be evidence of some minor points not being covered by the work.
18-20	Good to Very Good, work exhibits a strong arguments which are broadly supported by references to high quality academic material. Work may show some omissions of not be fully balanced in its approach.
15-17	Satisfactory, the answer shows a fair understanding of principles underpinning the questions but it is lacking one some depth, such as exhibiting poor referencing or a lack of reading. Work may show some omissions and may not fully address the questions.
12-14	Fair but weak, References are weak and the work lacks depth however the main issues are covered by the answer but there may be some impotent omissions.
9-11	Weak Unsatisfactory answer is not balanced, lacks any true depth and shows little in the way of reading. There may be some attempt to answer the question but it may contain flaws and omissions.
0-8	Incomplete and/or Irrelevant. Work is substandard and fails to address the question.