



Northumbria
University
NEWCASTLE

Dates and Mechanisms for Assessment Submission and Feedback

Date of Handout to Students:

14th October 2019

Mechanism for Handout to Students:

ELP

Date and Time of Submission by Student:

6th January 2020 (by 11:59 pm)

Mechanism for Submission of Work by Student:

ELP - Turn-it-in

Date by which Work, Feedback and Marks will be returned to Students:

4th February 2020 (20 working days)

Mechanism for return of assignment work, feedback and marks to students:

Email

Further Information

Learning Outcomes tested in this assessment (from the Module Descriptor):

Knowledge & Understanding:

1. Demonstrate in-depth knowledge and understanding of current best practice in the design and development of Object Orientated systems

Intellectual / Professional skills & abilities:

2. Design a system using advanced object orientated principles and methods, such as Behavioural, Creational and Structural design patterns, ensuring a high level of quality and data security.
3. Implement and test Object Orientated programmes using advanced techniques ensuring a high level of quality and data security.
4. Critically evaluate the effectiveness of implemented Object Orientated applications

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

5. Demonstrate a professional understanding of the importance of software quality in the development of applications.

Assessment Criteria/Mark Scheme:

See Appendix C for assessment criteria. Note that this work is worth 100% of the module and that the marks total 100 marks.

Nature of the submission required:

Individual work: The individual report should be a single document, and it must be in PDF format. You are required to upload this using Turn-it-in (ELP) as an originality report is required. Your work must be uploaded no later than 6th January 2020. You should name this file so that it is clearly your individual work and should contain your **student ID** as part of the document name.

Group work: A ZIP file should be created that contains your entire Visual Studio project, including the test project. Justifications of choices made such as patterns used and the data access layer need to be in a PDF document called justifications. The document should be in the root of the folder, you also need to supply a file which contains a list of all names and student ids of the group members "group.txt". Each C# software component should have the names of the group members within the comments at the top of the code. The ZIP file should also contain files for your Design (Task 2) and Testing (Task 4) these should be in PDF format and need to be legible (easy to read) it is your responsibility to check the PDF files are legible.

Referencing Style:

Where you have used words from someone else (quotations), they should be correctly quoted and referenced in accordance to the Northumbria Harvard System. You will be required to submit the report for the work via turn it in.

Cite them Right can be found [here](#)

Group work

The size of a group is two students; you are expected to form your own groups by the end of teaching week 4. One member of each group must email the module tutor giving the names of the group members. Anyone without a group at the beginning of week 5 will be assigned to a group. In the rare event that a group is not working well together it may be disbanded. The module tutor will have final say when this occurs, It will only happen if there is sufficient documented proof that one member is not contributing to the work, in such eventualities it will be expected that you work individually on the assessment.

Expected size of the submission:

Expected size of written work is stated on the individual sections.

Academic Misconduct:

You must adhere to the university regulations on academic misconduct. Formal inquiry proceedings will be instigated if there is any suspicion of misconduct or plagiarism in your work. Refer to the University's regulations on assessment if you are unclear as to the meaning of these terms. The latest copy is available on the university website. Quote or paraphrase other work with caution. Please discuss with the module tutor if you are unsure what is expected.

Handbook of Student Regulation can be found [here](#)

Individual and Group components

Each task clearly states if the task is individual or group work. Submission of individual work will be at the same time as group work however these will be separate submission.

Peer Assessment and Group Diary

In order to complete the group work you will need to work with another student. It is important that you evenly distribute the work between yourselves and work effectively with each other. You are required to keep a diary so that you log and minute all communication and meetings. The diary will be required as part of the evidence in the portfolio.

You must also supply **one peer-assessment form for each group member. This will need to be agreed and signed by each group member.** The peer assessment template is available on the module web page. Completed forms need to be scanned or photographed and need to be uploaded as part of your group work assessment.

If the diary and/or individual peer assessment forms are missing then the group part of this assignment, will be capped at 50%. Based on the peer assessment form you will be able to calculate a score of between 3 and 8 which measures your peers views of the quality of your team work in this task. We reserve the right to consult with you and potentially change the weightings (and in extreme cases marks) when this is felt necessary. We will not do this before the assignment is handed in. On the form each student's performance in the team is graded by a number of criteria. Each criterion will be given a score of between 3 and 8. Once all the 9 criteria have been graded the average score across the criteria for the student will be determined. This is called Team Work Score, which will be between 3 and 8. Calculate this by adding up the score for each of the nine criteria and then dividing by nine. Once the peer assessment forms have been completed for all members of the group it is possible to determine the group average. This is calculated by adding up the Team Work Scores for all the group members and dividing the total by the number of group members. A weighting can then be calculated by dividing the students Team Work Score by the group average. The weighting applies to only the group component of the assessment. A student's mark will be determined by multiplying the group mark by the weighting. This will be calculated to the nearest whole number

See ELP Document "Example_Peer_Assessment_Form"

Assessment Scenario

Case Study: Away-Day-Planner

Background

Away-Day-Planner (ADP) is a company that specializes in organizing away days for its clients which are other companies. Many larger organizations have policies requiring departmental heads to organize yearly away days, additionally some organizations require events to reward staff on successful completion of a project. Departmental heads are often busy with the day to day running of their department and have little time to spend on organizing away days. This is where ADP comes in as it allows departmental heads use their specialist services to organize departmental away days. Although ADP does have staff which can go to an away day and facilitate some activities it is often the case that ADP is used only to organize and book an event which the client company will run their own events at.

There are two main types of package available from ADP: the first is simply a booking service where ADP will find and book the required facilities and services, this requires ADP to use third party companies as local contractors. The second type requires the same bookings at the first but have an additional component of a facilitated session. Facilitated sessions are ones where staff from ADP attend the away day and administer an activity as part of all the day's events.

ADP services offers clients a wide range of options, this is an attempt to try and meet the needs for most away days, however a client may ask for additional items which are not covered in the common list of options. For example they may specify that they wish it to take place at a sports venue or that they want an open bar (free for their staff, bill to be settled with the company). ADP away day service offers the necessary level of tailored flexibility in order to meet almost all the needs of potential clients.

The following is a list of common away day options, however this list is not final can be added to in order to meet the client needs: Conference Facilities, Bus transport to and from the away-day, Mid-Day Lunch, Pack lunches, Morning refreshments, Afternoon refreshments, Orientating maps (when the away day is a walk in a national park), Evening meals.

Facilitated Activities and costs		
Title	Notes	Cost
Chocolate producing and marketing	Includes prizes for winning team, requires conference facility booking.	£750
Team building outdoor problem solving	Includes prizes for winning team, takes place in outdoor public space.	£850
Meditation and mindfulness workshop	Participants must wear loose fitting clothing, requires conference facility booking.	£500
Wall climbing experience	Size limited to 30	£700
Go-cart Experience	Offered only within 30 miles of Newcastle upon Tyne. Limited to 40 participants	£1400

Many of the services require booking with third party organizations, for example, conference facilities, bus transport and catering or restaurants. ADP books these on behalf of the client and the cost plus 50% (organization fee) is charged to the client.

Additional facilitated activities charges, if the client is more than two hours drive from ADP, and then an additional charge is made so that staffs are able to stay at in a hotel and travel back the next day, this means that staff would be unavailable for two days rather than one, so there is an additional fee charged at 50% to the normal facilitated costs. Note there is currently only one facilitator team. Therefore when the facilitator team is in transit they are not available for another away day.

Initial Enquiry

When a client company makes an initial enquiry a check is made to see if they are a previous client. Any matching company details are retrieved from by the system. The details are displayed, the client must verify the information is correct and any out of date information is updated.

New companies must register first, if it is a pre-existing company but a different department to the one which was originally registered a new record is created from the department and the client information will remain the same.

In order to mitigate the risks of liability, the company records all communications; this includes emails, letters and telephone conversations. The communications data must be stored for no more than one year after the successful completion of an away day. If there is a disagreement with the client including possibility of legal action, then the communication will be stored for five years. At the end of the period the communication will be weeded from the system. The weeding should be done once a month, on the last day Friday in the month.

Communication data must be assessable relative to the data with which it relates. For example: if a bus is required for an away-day or catering the communication with third party companies is shown on screens related to these activities.

Selection of options

Once a company is re-register it can request an estimate for the cost of the away-day, the day of the planned away day is recorded along with the number of attendees and information regarding the flexibility of dates.

ADP uses third party companies to provide the series so a precise cost estimate will normally take 24 hours to complete, once the client has made an initial request. This is to allow ADP to check with local providers for their price and availability.

The system used by an ADP operator captures the outcome of the discussion with the client regarding the elements needed for their proposed away day. A client may ask for the price of some of the options so that they can choose whether to include them or not. No prices are discussed at

this stage, not until the actual costs are known. As clients' needs may vary from the list of options, the system must also be able to add non-standard requests this may include elements such as bar, disco event for the evening.

Diary check, for facilitated events a check is made to make sure that the facilitator team is not already booked. If there is a check is made to see if there is flexibility on the client side. If there is no flexibility and the facilitator team is already booked then the request is cancelled.

If the client has requested catering or evening meal then additional information must be captured such as the type of cuisine and whether it is individual meals or a buffet.

Initial costing

The completed list is now ready for initial costing. An ADP operator uses the internet to find local venues and third party contractors which can fulfil the client's needs. A check is made to see if they are available and what prices they offer. Once all the items have been checked for price and availability a PDF document is generated by the system which has an overall cost. Any items the client wished to know the optional costs are detailed, so that the client can choose to include them if they have the budget. Note that the all costs include the 50% organization fee.

The form PDF is sent to the client, and they are informed that nothing is booked and that the sooner they book the greater the change of availability and the cost remaining the same. They are warned that costs could rise if suppliers change or it also may not be possible to offer a specific service such as the facilitated sessions if another company commits to making a booking for the same day/s.

Booking

If the client accepts quickly it is usual that the venues and third part companies can still fulfil the dates and prices quoted. If there is significant delay it may mean that the initial prices rise as alternative contractors will be required. In some circumstances the client may also need to rethink their day for example if they have a requirement that it takes place at the conference facilities at a sporting venue. It is possible that it is no longer available. It is possible at this stage that the process is cancelled or restarted with alternative dates.

Firstly a check is made with all the third party companies to see if they are still available on the date first requested. If not then alternatives are found and any new costs are added to the job. Once all activities have been rechecked the client must agree one last time to the final charge amount. Once they have done this the books will take place on the same day.

Any third party contractors who require payment in advance are paid. Some may require a deposit others full payment. All payments sent to third party companies must be recorded by the system.

Client Confirmation

Once booked an itinerary in PDF format is generated so that it can be sent to the client, it will also contain information about the agreed cost and a reminder that the bill must be paid within 30 days. If there is catering or restaurants booked an additional form is sent to the client, asking for any specific dietary requirements. This is to capture the number of vegetarians and anyone with an allergy or food intolerance. Once completed by the client the details are stored and also sent to the third party catering firm or restaurant. The system must be flexible enough to allow for changes to the third party company if needed for example if one of the client employees has a severe nut or

seed allergy it may not be possible to use particular restaurant as the allergen is common the selected cuisine.

Cancellations

When a client first registers they are automatically sent the terms and conditions. This includes the cancellation charge policy. Cancellation charges help to protect the company from changes they may incur from third party companies when cancelling bookings and partly to cover the cost of the time which has been already been spent in the initial creation of the away day planning.

Cancel more than 60 days in advance – 20%

Cancel between 60 days and 30 days – 50%

Cancel between 30 days and 15 days – 75%

Cancellation under 15 days is not possible. The client will be charged 100% of the fee. No cancellation will be made to any of the booked services offered by third party companies and the client will be informed that the day is booked and they can use the day as planned as they will incur the full fee.

If the cancellation has taken place within the permissible period then the activities booked with third party companies will be listed so that they can be contacted and any booking can be cancelled. Note that cancellation fees may need to be paid. These are paid immediately and recorded against the cancellation information.

Additional Charges

ADP has been asked on occasion to offer an open bar or one which has a fixed amount of money placed behind it. In this event the company must pay in advance either the full fixed amount or £25 per person. This must be paid 2 days before the event is due to take place.

Final Billing

The first business day after the away day, an invoice will be sent to the company. If they asked for an open bar and have already paid the £25 per head in advance, then any differences are offset against the final billing amount.

Recording payment and dealing with non-payment

A client company has 28 days to settle bills. Once the outstanding amount has been paid by the client the away day will be closed on the system, an indicated profit will be shown (not including overheads). A weekly exception report will be generated for any unpaid invoices so that the company can be chased the client for payment. In the rare event of non-payment after sixty days then it is usual to start legal proceedings to recover the debt, or to sell the debt to a specialist debt recovery company. In these two eventualities the outcome choice of outcome will be recorded and all the correspondence data about the booking will be flagged, preventing it from being weeded by the system. If a satisfactory outcome has been achieved, the communications data will be set for deletion in one year from the date a satisfactory outcome was achieved.

Proposed System

The proposed system will support the entire process as outlined above. It is envisaged that requirements may change over time and that the system will be built in a number of phases.

Task 1 Research Question (Individual Work)

30 marks

This task is an individual task and covers the following learning outcome.

1. Demonstrate in depth knowledge and understanding of current best practice in the design and development of Object Orientated systems

In this task requires you 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.

Many new software developments are moving away from cooperate controlled servers with the entire application working from the cloud. Microsoft Azure is no longer just about offering virtual machines and database storage, it now contains many development tools such as “Visual Studio Code” and “Azure DevOps”. Additionally advanced tools such as machine learning are also now easily realisable in the Azure package. Database Encryption and VPNs are used to secure the cloud based applications.

The company you work for is undecided as to whether to develop their application using these cloud services. The main worry in the company is that of data security, you must examine and report on the data security used within the Azure cloud based applications, and also what additional security measures that could be added into the application in addition to that which has been provided by Azure. It is not sufficient to say that encryption could be used. You must be specific and discuss how it would be implemented in an object orientated system which uses Entity Framework and LINQ. You should also state any additional pitfalls which may arise from using encryption.

References from good-quality, relevant literature must be used in order to strengthen any points that you raise in your discussion.

Word Limit 2000

Task 2 UML Designs and OOP considerations (Group work) 10 marks

This task assesses the learning outcome.

Design a system using advanced object orientated principles and methods, such as Behavioural, Creational and Structural design patterns, ensuring a high level of quality and data security.

Produce an implementable class diagram for the system you are developing, this should show your final design of the software components and clearly show architectural patterns used in the development of the system. You are expected to use Design Patterns in the creation of you product, and you are also expected to show layering of the application, patterns should be considered in each of the layers for example you are expected to use a presentational Patten in the interface layer. This work should only include the requirements which you are expecting to implement during the time-box.

(5 marks)

Justification, you must provide a justification for any of the patterns you have chosen to implement. Outlining reasons why the choices have been made, as well as any data security decision you have made. (5 marks)

Task 3 Implementing the technical Solution (Group work) 20 marks

In this task the following learning outcome is assessed.

Implement and test Object Orientated programmes using advanced techniques ensuring a high level of quality and data security.

You are not expected to try and implement the entire system. Agile methods require a subset of requirements to be taken into a time-box for development. You can apply MoSCoW to list of requirement, this will help you decide on what requirements you plan to implement. However you are expected to pick requirements which work together so that you can demonstrate a working subsection of the entire system, you should use vertical development.

You are expected to develop the application using the standard three layer model and the domain and presentation layer should contain some of the patterns covered in the module.

A relational database must be used to store your application data. However you are expected to create an object orientated system. Therefore you must consider how the objects link to the database CRUD operations. It is strongly recommended that you use Entity Framework however this is not compulsory and other data access such as ADO level 2 may be used however a fully justification as to why should be provided.

The system must be implemented using Visual Studio 2017 C# and the application must run on Visual studio 2017 professional in the lab. Other languages and/or platforms will receive a mark of zero.

You may include instructions as to use which would include any valid logon details or user details that you have created. You will be required to use a database for the development of the application; the only condition is that the application must run in the lab.

The code is marked on the following aspects:

- Scope Quality of technical implementation 15/20
- Justification and implementation of data access layer 5/20

Task 4 Testing (Group work)

10 marks

In this task the following learning outcome is assessed.

1. Demonstrate a professional understanding of the importance of software quality in the development of applications.

Testing should be carried out at the unit level, making sure the component works as expected, and at the system level using user requires (scenarios) as a basis for creating the tests. You should be both positive and negative testing.

Visual Studio provides an inbuilt testing framework, you are expected to automate as many of the tests as possible using the inbuilt unit testing framework. If you have used decency injection/mock objects to isolate classes you should make this clear in your strategy.

Task 5 Evaluation of the development process (Individual Work) **15 marks**

In this task the following learning outcome is assessed.

1. Critically evaluate the effectiveness of implemented Object Orientated applications
2. Demonstrate a professional understanding of the importance of software quality in the development of applications.

Many iterative methodologies incorporate an evaluation step at the end of each development time-box. The purpose is to reflectively evaluate the development increment so that lessons can be learned, and improve the development process in future increments. In this section you are required to critically evaluate development process and the tools used.

- Critically evaluate the approach you used in selecting what requirements in implement in the development time box, you should consider the logical grouping of the functionality and if you choose to many or two few requirements to implement.
- Teamwork, you need to critically evaluative how you're team worked together in producing the technical solution. If any problems occurred they should be listed as well as any attempt to reach a resolution.
- Tool evaluation: Critically Evaluate: the development environment, database chosen and the use of testing tools in the development of the system.

Approximately 700 words

Task 6 Evaluation of the technical solution (Individual Work) **15 marks**

In this task the following learning outcome is assessed.

1. Critically evaluate the effectiveness of implemented Object Orientated applications

Critically evaluate the Design and Implementation in relation to the object orientated principles covered in the module. You must consider the patterns you have used and discuss if they were effective and also discuss any patterns you have not implemented but believe to be relevant.

Critically evaluate your application in terms of security. Where you have identified a problem or shortcoming in the application, you should discuss technical solution needed to mitigate the problem. If you did the directed work regarding password security you should evaluate the solution you have or wish to apply to the scenario, and comment on the usefulness of the literature you found regarding password security.

Word limit: 1000.

APPENDIX C

Marking criteria

Task 1 Research Question (**Individual Work**) marks

30

The criteria used for marking will include:

- The quality and scope of the literature survey.
- The principle arguments and conclusions of the work undertaken.

Grade	Criteria
70-100 %	The question will have been very well considered in terms its broad implications. Overall the work is concise complete and detailed, arguments and collusions made are well presented and backed up by literature.
50-69 %	Work lacks some degree of scope, question has only been partially considered or it lacks the depth in its answer. Work may lack references or arguments and collusions are not backed fully backed up by literature.
0-49 %	Work failed to address the question with any degree of depth or the work lacks sufficient references. Failure to reach a collusion based on rational reached arguments.

Task 2 UML Designs and OOP considerations (**Group work**)

10 marks

Implementable Class Diagram showing patterns and layers 5 marks

Justification of the patterns used or their absence 5 marks

Grade	Criteria
70-100 %	Diagrams are complete and are implementable. Patterns are clearly visible and are accompanied by a narrative which clearly states why they are being applied. Students are expected to show application split in two at least three layers.

50-69%	Diagrams contains flaws which would affect the implementation. Patterns may not be well considered and the narrative explaining the rational lacks depth. The application layers are not clearly defined.
0-49 %	Diagrams are incomplete or non-implementable and or the consideration of pattern is either missing or is poor.

Task 3 Implementing the technical Solution (Group work)

20 marks

The criteria used for marking will include:

- scope Quality of technical implementation 15/20
- Justification and implementation of data access layer 5/20

Grade	Criteria
70-100 %	A reasonable set of requirements are implemented given the time frame. Importantly the scope of requirements should not be at the cost to the quality. The system must demonstrate sound engineering principles such as the use of patterns in the all three layers of the application. Presentation layer should use a pattern to separate responsibilities or presentation and control. The system works with objects and is not data focused (object persistence in the database). Patterns need to be also evident in the domain layer.
50-69%	Quality of the application and/or the engineering has problems such as failure to consider patterns in the presentation and data access layer.
0-49 %	Scope and or quality of allocation are poor. There is little consideration of the implementation of patterns.

Task 4 Testing (Group work)

10 marks

The criteria used for marking will include:

- Test plan based on user requirements both negative and positive testing's
- Tool based unit testing also with test plan.

Grade	Criteria
70-100 %	Testing needs to be positive and negative in nature. Tests must be at a unit and systems level, fully documented and unit level should be fully

	implemented in Visual Studio in built test suite.
50-69%	Scope of the testing is incomplete this may be due to poor choices of presentation pattern or a lack of scope in the tests chosen.
0-49 %	Testing is incomplete or missing.

Task 6 Evaluation of the development process (**Individual Work**)

15 marks

Required items to evaluate

- Critically evaluate selecting requirement.
- Teamwork
- Tool evaluation

Grade	Criteria
70-100 %	Requirements, teamwork and tools have been critically evaluated and the work contains good arguments and reflections that would help to inform future iterations of the development. If there have been problems with the teamwork then a reflection as to why it occurred and what could be done to resolve such problems at an early stage should be discussed.
50-69%	All aspects have been evaluated however the evaluation lacks the necessary depth needed to inform further iterations.
0-49 %	Evaluation missing key elements or no real attempt to evaluate the work in detail.

Task 7 Evaluation of the technical solution (**Individual Work**)

15 marks

Required items to evaluate

Design and Implementation in relation OO (patterns and principles).
Application Security including solutions to identified weaknesses. .

Grade	Criteria
70-100 %	Overall an excellent evaluation of the technical solution, Identification and reflection of the weaknesses, as well and the achievements. This must include the OO considerations such where patterns were used to good effect or missing or incorrectly used. Security must be discussed

	including what needs to be protected via encryption
50-69%	Satisfactory evaluation lacks some important items or lacks depth especially in offering alternatives or identification of weaknesses. Security evaluation has weaknesses in scope or type of security being recommended.
0-49 %	Evaluation missing key elements and/or alternatives.