



Prifysgol Cymru
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University of Wales
Trinity Saint David

Examination Answer Books

12 Pages

Instructions to Candidates

- Please give the information requested in the boxes below.
- Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
- The answers must be legibly written. The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.
- Write your answers in ink.
- Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
- No part of this book is to be torn out; it must be handed in complete.
- If more books than one are used, fasten them together using the tags available from the invigilator(s).
- Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.

Complete, fold and seal
(see note 2 below)

SURNAME:

Browne

FORENAME(S):

Lee

1	Student Number	LB075880
2	Title of Examination Paper	SOFTWARE DEVELOPMENT
3	Module Code	ACCA A017
4	Date and Time of Examination	09/01/19
5	Examination Venue	COLEGE SIR GAR G42
6	Seat Number	
7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
1a	2
1b	2
1c	6
1d	5+0
2a	5
2b	0
2c	0
3a	0
3b	0
4a	4
4b	8
4c	0
Total	32

✓
✓
✓
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✓
✓
✓
✓
✓
✓

195 ✓

34 ✓

Q1

(a)

A queue data structure is a structure based on a First In First out scenario. Basically the first item to be added to a queue is the first to be removed. With a queue data structure you have two pointers which indicate where the front of the queue is and where the back of the queue is. These pointers are called the front pointer and the back pointer.

An example of a queue would be a printing system on a computer network. When a document has to wait for the document in front to be processed first before the printer moves onto the next. This structure is more suited because it allows for things to be processed first before moving on.

Q1

(b)

A stack data structure is a structure based on a Last In First out scenario. Basically when an item is added to the back of a queue. When there is an item to be removed from the queue the item is ~~also~~ also removed from the back of the queue.

An example of a stack data structure would be when a program is run and a subroutine is called. The address where the process stopped is put onto the back of the queue. When the ~~process~~ ^{sub routine} is stopped/processed, the address is removed from the back of the queue and the program carries on where it left off. This way makes the program more efficient because it takes less time searching the memory.

Question No.

Q1

- (c) Recursive algorithm is a process in which a function calls ~~itself~~ as a subroutine. This allows the function to be repeated several times, since it calls itself during its execution. Functions that incorporate recursion are called recursive functions. It is often seen as an efficient method of programming since it requires the ~~least~~ ^{necessary} amount of code to perform the ~~task~~ task/function.

The basic steps of quick sort are:

- 1) Pick a single item from the list and call it pivot x_p
- 2) Reorder the list, so all items which are less than the pivot are before it and all items which are larger come after. Once this operation is complete the pivot will be in its final position. This is known as the partition phase.
- 3) Perform steps 1 and 2 recursively on all items less than x_p and again on all items greater than x_p . Keep doing this until the number of items smaller or greater than x_p is one or zero.

Q1

- (d) Object Oriented programming has four ~~main~~ paradigms:

- Procedural: Imperative programming with procedure calls
- Event-driven: Control flow is determined by asynchronous actions (from humans and/or sensors)
- Visual: the application of computer graphics to software design.
- Mark-up: Combines textual content & additional information about the textual content.

Question No.

① d) **Object oriented programming** also has classes. ✓
 Classes is a generalisation of a object. A container for data and code. Data within the class can be accessed with properties. The code is referred to as methods. It also has objects which is an instance of a class in memory. Then attributes which are keyword-like tags where you can specify additional information about entities. ✓
 Or ✓

Object oriented programming fosters component based approach to software development so that you first create a system by creating a set of classes. Then you can expand the system by adding capabilities to components you have already built or by adding new components. Finally you can reuse the classes you have created when you build a new system cutting down substantially on system development time. ✓
 Inheritance is an important concept in OOP. Inheritance is a concept in which you define parent classes and child classes. These classes inherit methods and properties of the parent class, but at the same time can also modify the behavior of the methods if required. ✓

Q4 (a) 1) **White box testing**: Is a software testing method in which the internal structure / design / implementation of the item being tested is known to the tester. ✓
 The tester chooses the inputs & exercise paths through the code and determines the output. ✓

2) **Black box testing**: - is a software testing method in which the internal structure / design / implementation of the item being tested is not known to the tester. These tests can be functional or non functional, though usually functional. ✓

Question No.

4) a) Grey Box testing: is a combination of black box testing and white box testing. In black box testing, the internal structure of the item being tested is unknown to the tester and in white box testing the internal structure is known. Grey box testing, the internal structure is partially known. This involves having access to internal data structures and algorithms for purpose of designing the test case, but testing at the user, or black-box level.

Q4

- 6) Unit testing is a software development process in which the smallest testable parts of an application, called units, are individually and independently scrutinized for proper operation. Unit testing can be done manually but is often automated.

Unit testing is a component of test-driven development, a pragmatic methodology that takes a meticulous approach to building a product by means of continual testing and revision. Test-driven development requires that the developers first write failing unit tests. Then they write codes and refactor the application until the test passes. TDD typically results in an explicit and predictable code base.

Unit test involves only those characteristics that are vital to the performance of the unit under test. This encourages developers to modify the source code without immediate concerns about how much such changes might affect.

Question No.

Q4

(5)

the functioning of other units or the program as a whole. Once all the units in a program have been found to be working in the most efficient and error-free manner possible, larger components of the program can be evaluated by means of integration testing.