TSSM
Creating VCE Success

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2016 Trial Examination

STUDENT NUMBER

									Letter
Figures									
Words									

SOFTWARE DEVELOPMENT

Units 3 & 4 – Written examination

Reading time: 15 minutes
Writing time: 2 hours

QUESTION & ANSWER BOOK

Structure of book

Section	*Number of questions*	*Number of questions to be answered*	*Number of marks*
A	20	20	20
B	5	5	20
C	15	15	60
			Total 100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers and one scientific calculator.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.

Materials supplied

- Question and answer book of 23 pages with detachable insert containing a case study for Section C.

Instructions

- Print your name in the space provided on the top of this page.
- All written responses must be in English.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic communication devices into the examination room.

SECTION A – Multiple-choice questions

Instructions for Section A

Answer **all** questions in pencil on the answer sheet provided for multiple choice questions.
Choose the response that is **correct** or that **best answers** the question.
A correct answer scores 1, an incorrect answer scores 0.
Marks will **not** be deducted for incorrect answers.
No marks will be given if more than one answer is completed for any question.

Question 1

What is the following diagram an example of?

Variable name	Type	Size	Scope	Description
intClientNumber	Integer	6	Global	A unique ID number given to every client
strName	String	20	Global	The name of the client
boolMember	Boolean	1	Global	Whether the client is a member or not
.....				

A. An IPO chart
B. Aa data dictionary
C. An object description
D. A data structure diagram

Question 2

Ben is writing user documentation for a program that he recently created. What stage of the problem solving methodology is he currently in?

A. Analysis
B. Design
C. Development
D. Evaluation

Question 3

Which is not a processing feature of a programming language?

A. Instructions
B. Procedures
C. Control structures
D. Data structures

SECTION A - continued

Question 4

Which of the following is **not** considered a non-functional requirement?

A. Response rate
B. Marketability
C. User-friendliness
D. Reliability

Question 5

What can a data flow diagram (DFD) include that a context diagram cannot?

A. A DFD can contain data stores whilst a context diagram can not.
B. A DFD can contain multiple external entities whilst a context diagram can not.
C. A DFD can contain direct data store to data store communication whilst a context diagram can not.
D. A DFD can contain direct entity to entity communication whilst a context diagram can not.

Question 6

Iteration is an example of a:

A. procedure.
B. function.
C. method.
D. control structure.

Question 7

Allan is creating a new app where customers will be required to login and complete transactions entirely online, which Allan believes will save him a significant amount of money compared to more traditional methods of selling products.

Which of the following features would be most important to customers?

A. Security of transactions
B. Consistent placement of navigation
C. Speed of processing transactions
D. Cost of developing the site

Please use the following algorithm to answer questions 8-10

```
1    BEGIN
2         x ← 4
3         y ← 1
4         REPEAT
5              x ← x / 2
6              y ← y + 1
7         UNTIL y > x
8         DISPLAY x, y
9    END
```

Question 8

What is the output from the algorithm above?

A. 4, 1
B. 6, 4
C. 1, 3
D. 2, 2

Question 9

Lines 4-7 in the algorithm are known as:

A. Sequence
B. Iteration
C. Selection
D. Recursion

Question 10

What is line 2 of the algorithm known as?

A. A method
B. A function
C. An event
D. An instruction

Question 11

In a use case diagram, a stick figure would represent:

A. an actor.

B. a process.

C. an external entity.

D. a system boundary.

Question 12

Which of the following would ensure that a user can only enter a whole number into an order form for ordering pizzas online?

A. A range check

B. A check digit

C. A type check

D. An existence check

Question 13

Which of the following best describes validation?

A. Checking the validity of the results produced by a solution

B. Checking the reasonableness of data input into a system

C. Ensuring that the solution solves the original problem

D. Documenting errors within the logic of a solution

Question 14

Why should programmers adhere to naming conventions when creating variables?

A. It will assist future programmers to maintain the program.

B. It reduces the time that it takes to compile a program.

C. It forms the basis of an effective user manual.

D. It makes the program more efficient to use by the end users.

Question 15

A marketing organisation in Western Australia has purchased personal details of the clients of a local mining supplies store. They have then sent out letters to the addresses of these customers trying to get them to purchase similar goods.

Which law is this in breach of?

A. Charter of Human Rights and Responsibilities Act 2012

B. Spam Act 2003

C. Privacy and Data Protection Act 2014

D. Information Privacy Act 2000

The following algorithm is used for questions 16-18

```
IF studID[curr] = "PAT529" THEN
     StudentFound ← False
END IF
```

Question 16

Which data structure is `studID[]` an example of?

A. File

B. One dimensional array

C. Record

D. Two dimensional array

Question 17

What data type is the variable `StudentFound`?

A. Integer

B. Character

C. Floating point

D. Boolean

Question 18

There is an error in the above algorithm. This type of error is known as a:

A. Syntax error

B. Processing error

C. Logic error

D. Run-time error

SECTION A - continued

Question 19

Which of the following is **not** a characteristic of data that has integrity?

A. Affordability

B. Accuracy

C. Timeliness

D. Correctness

Question 20

Which of the following is the best definition of the term "VPN"?

A. A global network of computers that uses Internet Protocol to facilitate communications.

B. A computer network used for employees of an organisation to access their files from home that uses encryption to ensure that transmissions are secure.

C. A model used to describe the way in which data is transferred between computers across a network.

D. A computer network used to share information, services and operational systems within an organisation.

END OF SECTION A
TURN OVER

SECTION B - Short-answer questions

Instructions for Section B
Answer **all** questions in the spaces provided

Question 1 (2 marks)
Distinguish between a method and an event.

_____

_____

_____

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_____

Question 2 (2 marks)
Outline the purpose of an associative array.

_____

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Question 3 (10 marks)

Refer to the following algorithm when answering the questions that follow:

```
1.       FOR i ← 1 TO n-1 DO:
2.                 subList ← i
3.           FOR j = i + 1 TO n-1 DO:
4.                 IF A[ j] < A[subList]
5.                       subList = j
6.                 END IF
7.           NEXT j
8.           temp ← A[i]
9.           A[i] ← A[subList]
10.          A[subList] ← temp
11.   NEXT i
```

a. Identify the appropriate data type or data structure for each of the following variables contained within the algorithm. You may select from: Integer, floating point, 1D array, 2D array, stack, character, string, Boolean.

3 marks

Variable name	Data type/structure
i	
A[]	
subList	

SECTION B - continued

TURN OVER

b. Using the algorithm on the previous page, explain how a selection sort works.

3 marks

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_____

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c. Identify the line number where they appear, and describe how selection and iteration work.

2 x 2 = 4 marks

Selection: _____

_____

_____

_____

_____

Iteration: _____

_____

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_____

SECTION B - continued

Question 4 (3 marks)

Using examples, distinguish between accidental, deliberate and events-based threats to the security of data and information shared between information systems.

Question 5 (3 marks)

Outline what is typically involved in the testing of a solution.

END OF SECTION B
TURN OVER

SECTION C – Case study

Instructions for Section C

Answer **all** questions in the spaces provided. Remove the case study insert and read **all** the information provided before you answer these questions. Answers must apply to the case study.

Question 1 (4 marks)

During planning, a sample Gantt chart has been provided by Terry and he would like to have something similar created for the development of the updated system. However, he is unsure of some of the terminology used.

Tasks	Duration (Days)	Predecessor	Timeline (Days)															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A	2																		
B	3	A																	
C	2	A																	
D	4	C																	
E	3	B, D																	
F	2	E																	
G	2	F																	

a. In relation to project management, define the following terms:

2 marks

Milestone: _____

_____

_____

_____

Critical path: _____

_____

_____

_____

SECTION C - continued

b. Using an example from the diagram, describe the term "slack time".

2 marks

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Question 2 (4 marks)

a. Distinguish between an organisational goal and an organisational objective.

2 marks

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b. Explain how the new software solution for TMTA could assist Terry in achieving his organisational goals.

2 marks

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SECTION C - continued

TURN OVER

Question 3 (3 marks)

Outline three tasks that will be involved with analysing the information system.

Question 4 (4 marks)

Justify two data collection methods that *Fast IT Solutions* could use to learn what should be included in the new solution. Refer to the collection method and stakeholders in your response.

Question 5 (4 marks)

Terry has been told that when selecting a skill that a student is competent in, validation will need to be included. *Fast IT Solutions* have said this will include existence checking, type checking and range checking.

Define the term *validation*, and explain why the three methods of validation recommended must occur in the order listed.

Question 6 (4 marks)

Outline two privacy principles under The Privacy Act 1988 that Terry must be aware of when storing and communicating data supplied by students.

SECTION C - continued

TURN OVER

Question 7 (6 marks)

Terry wants to have it as easy as possible for qualified tradespeople to log onto the system and input when one of the students has become competent at a task. They would like an algorithm designed that allows a user to enter a skill, then it will search for that skill from an unordered file (*skillsFile*) to see whether it is a skill that the student requires or not. It will then either display to the user that the skill has been added to the student's list or it will display that the skill is not required.

Write this as pseudocode.

Question 8 (4 marks)

Outline two non-functional requirements that will be important considerations for the new system.

Question 9 (2 marks)

Describe a security method that will enable data to be secure as it is transmitted from the mobile device that a user is entering it into back to the TMTA.

SECTION C - continued

TURN OVER

Question 10 (7 Marks)

Now that much of the solution has been developed, Terry has decided that he would like extra functionality added to search for a particular tradesperson using their unique ID number. *Fast IT Solutions* has said that this will mean the solution will take longer to develop and they will be charged more. Terry is unhappy with this as he thought it should have been included from the start.

a. Explain how creating a thorough software requirements specification at the beginning of the process could have avoided this problem. 2 marks

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The following is the algorithm designed for searching through the file for a user record. As you can see *Fast IT Solutions* has decided that the most appropriate searching method is a binary search.

```
FUNCTION search(tradieList[], valueToFind)
     low ← 0
     high ← length(tradieList[])-1
     found ← FALSE
     WHILE low <= high AND found = FALSE
          mid ← (low + high) / 2
          IF list[mid] = valueToFind THEN
               Found ← TRUE
          ELSE IF list[mid] > valueToFind THEN
               High ← mid -1
          ELSE if list[mid] < valueToFind THEN
               Low ← mid + 1
          END IF
     LOOP
     RETURN found
END
```

SECTION C – continued

b. What must have happened to tradieList to ensure that a binary search will work effectively? 1 mark

c. Referring to the algorithm, explain how a binary search works. 4 marks

SECTION C - continued

TURN OVER

Question 11 (4 marks)

Identify two types of users for the updated solution, and recommend an appropriate form of user documentation for each.

Question 12 (4 marks)

Justify an appropriate training method for each of the following user groups:

Teachers: _____

Qualified tradespeople: _____

SECTION C – continued

Question 13 (3 marks)

At the end of each year, Terry would like to remove all current student records from his system, save them to an external hard drive and then enter all new student data for the following year.

Contrast archiving and backing up, and explain which of these Terry is undertaking.

Question 14 (3 marks)

Fast IT Solutions have remarked that they are having trouble adding the new features to the existing system as the original programmers didn't include internal documentation which makes it harder to understand. Outline the purpose of internal documentation, and why it would be beneficial to *Fast IT Solutions*.

SECTION C - continued

TURN OVER

Question 15 (4 marks)

List one criterion for measuring the efficiency of the new solution and one criterion for measuring its effectiveness. Describe a method for checking each criteria.

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END OF QUESTION AND ANSWER BOOK

CASE STUDY INSERT FOR SECTION C
Please remove from during reading time.

Case Study

Terry's Tradies

Terry Mitchell has started a small business, *Terry Mitchell Trades Academy* (TMTA) to assist people to become qualified in a range of trades such as electrical, plumbing and carpentry. He has done this in response to the rising demand for both new houses and renovations to existing houses, where demand for work outstrips the supply of qualified tradespeople.

TMTA has the following aims:

- Produce tradespeople of the highest quality
- Reduce the cost of becoming qualified
- Ensure that graduates are connected with industry to find stable employment opportunities

The course is largely run online, as students only need to attend the TMTA once a week, where they are instructed by their teachers. The other four days of each week the students spend on work sites, acting as apprentices in their chosen trades.

The online system currently allows students to enroll and access resources, but Terry would like to see this expanded upon to include past results and links to current employment opportunities. He is making use of a company, *Fast IT Solutions* to develop the new program.

As the course is largely practical, teachers as well as qualified tradespeople who work with the students will also need to access the system to input marks and comments, including checking off tasks that a student has become competent at, for example wiring in a new power point.

END OF CASE STUDY INSERT FOR SECTION C