THIS BOX IS FOR ILLUSTRATIVE PURPOSES ONLY

STUDENT NUMBER

Letter

Figures									
Words									

SOFTWARE DEVELOPMENT
Unit 3 & 4 – Written examination
(TSSM's 2018 trial exam updated for the current study design)

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	10	10	20
C	12	12	60
			Total 100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and ruler.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.
- Students are permitted once scientific calculator.

Materials supplied
• Question and answer book of 20 pages.

Instructions
• Check that your name and student number as printed are correct and sign your name in the space provided to verify this.

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. Circle 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
A characteristic of internal documentation is

A. modules

B. comments

C. font size

D. pseudocode

Question 2
Which of the following is not a non-functional requirement?

A. response rates

B. robustness

C. maintainability

D. pseudocode

Question 3
A measure of how little time, cost and/or effort is applied in order to achieve intended results is

A. efficiency

B. effectiveness

C. accuracy

D. rate of complaints

Question 4
Which of the tools below is used in the Design stage?

A. coding

B. Object Descriptions.

C. SRS

D. test table

Question 5

Analysis includes which of the following activities?

A. determining constraints

B. developing a testing table

C. producing an IPO chart

D. creating a quick start guide

Question 6

Which of the following is a technique used in linear searching?

A. use of a search tree to find a key from within a list

B. use of a hash function to map a key to a value

C. comparing the target value to the middle of a list

D. sequentially checking each element of a list to find a target value

Question 7

A constraint on a solution would be

A. response rates

B. portability

C. legal requirements

D. formats and conventions

Question 8

How is a trace table used in an algorithm?

A. it is used to record the results of several conditions that have been tested

B. it is used to clarify a program is working

C. it is used to test whether a program can hold a large volume of data

D. it used to record the tasks and how long they will take

Question 9

In which Software Development Life Cycle model is each stage completed one at a time?

A. Spiral Model

B. Agile Model

C. Waterfall Model.

D. Iterative Model.

Question 10

Which one of the following is *not* an event – based threat?

A. Power failure

B. Hacking

C. File corruption.

D. Acts of nature like a flood or earthquake

Question 11

Which sort algorithm uses a 'pivot'?

A. Insertion Sort

B. Selection Sort

C. Quick Sort

D. Bubble Sort

Question 12

The key tasks in planning software projects include:

A. identifying, scheduling and monitoring tasks, resources, people and time

B. identifying, scheduling and monitoring tasks, costs and people

C. identifying, scheduling and monitoring tasks, effort, costs and time

D. identifying, scheduling and monitoring tasks, resources, constraints and time

Question 13

Which of the following symbols below represent a system boundary in a Use Case Diagram?

A. oval

B. diamond

C. rectangle

D. dashed arrow

Question 14

A diagram that focuses on the interaction between the organisations information system and external entities is:

A. DFD

B. IPO

C. UCD

D. CD

Question 15

In the data dictionary below the data type missing would be

A. integer

B. string

C. char

D. Boolean

Name	Data Type
Firstname	string
Surname	string
Phone	?
Postcode	integer

Question 16

Which of the following is a characteristic of Extensible Mark-up Language (XML) file?

A. custom tags to define objects

B. contains macros

C. command line prompts

D. data components are integrated

Question 17

What type of loop is below

```
a=11
count = 0
while a>9 do
        a=a-1
        count = count +1
end while
```

A. post-test

B. sequence

C. conditional

D. pre-test

TURN OVER

Question 18

A user interface that has been designed to allow for the future addition of functions or features is:

A. responsive

B. efficient

C. scalable

D. familiar

Question 19

Which of the following characteristics of users influences the design of a solution?

A. vision impairments

B. shoe size

C. hair colour

D. hearing

Question 20

Unified Modelling Language (UML) is used to

A. develop command line programs

B. develop system scope and constraints

C. develop file compression

D. develop object-oriented software

END OF SECTION A

SOFTWARE DEVELOPMENT EXAM

SECTION B - Short-answer questions

Question 1 (2 marks)

What is documented in a Software Requirement Specification (SRS) and why is it important?

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_____

_____

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Question 2 (2 marks)

Explain why it is important to define the scope of a software solution?

_____

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Question 3 (2 marks)

Why is it important that a software developer follow coding conventions?

_____

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Question 4 (2 marks)

Describe how validation is used in the design stage as well as the development stage?

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Question 5 (2 marks)

When testing an algorithm for logic errors what should be included in test data?

_____

_____

Question 6 (2 marks)

Describe, using an example, the difference between screen size and screen resolution.

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Question 7 (2 marks)

What is usability testing?

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Question 8 (2 mark)

Explain one technique for recording the progress of a project?

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Question 9 (2 marks)

Explain the man-in-the-middle attack.

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Question 10 (2 marks)

List and briefly explain two types of errors that may be revealed when testing a software solution?

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END OF SECTION B

SECTION C – Case Study

Dr Neesha Smithy is a psychologist working in a large country town in Victoria. She works for the local hospital (which is an hour away from her home) and with youth who are in residential care across the region. Dr Smithy primarily counsels her patients regarding their personal problems, mediates for families/groups dealing with conflict and works with a small number of patients who have addiction issues. She has found splitting her time across these roles is becoming stressful and the travel is taking its toll on the good doctor and her family.

Dr Smithy would like to start her own private practice so that she can work from home and focus on counselling her patients. She feels the distance from her home to the venues she works at is preventing her patients from seeing her as much as they, and she, would like.

Dr Smithy has always been an avid user of technology and has an idea for "online" counselling that would give her and her patients a viable solution. She feels a software solution consisting of an app for mobile devices and a website with a backend database, detailing her services, costs and daily/weekly online booking system for appointments via Loom would be a success. Dr. Smithy has a desktop and laptop at home, which are located in the family room. Both devices have current specifications and her NBN connection has unlimited downloads. The desktop and laptop have up-to-date antivirus installed. Her three children have access to both desktop and laptop for school assignments and surfing the internet.

She envisions the software solution that details her qualifications and experience, services and costs, online booking form and in-person booking form, secure payment form, contact form and a list of technical requirements/online help for those wanting to make an online appointment. She thinks email confirmation and receipt would be efficient once a booking and payment is complete. Dr Smithy understands the need for security and protection of patient data, so she requires patients to "sign up" then they will be issued with a randomly generated username and password. She also would like to store and backup her data to cloud storage. Dr. Smithy has found cheap rates for cloud storage offshore.

Dr Smithy also wants to offer, 15 min sessions for free for those unable to afford counselling and as a way of attracting new patients. This would be done on a daily basis from 9:00 am to 9:45 am. New patients get a maximum of 2 x15 min sessions before they are required to make a paid online or in-person appointment.

Dr Smithy currently uses a spreadsheet to store her data and is keen to tidy it up to reduce errors and redundancy. She is pleased that she has allocated each patient an ID in the spreadsheet to ensure they can be identified easily using a combination of surname and first initial of their first name.

Dr Smithy has approached Reetek Technology Australia, a custom software firm that is based in Melbourne to design and develop a solution. The lead programmer, Jason Clarke, has taken on the job.
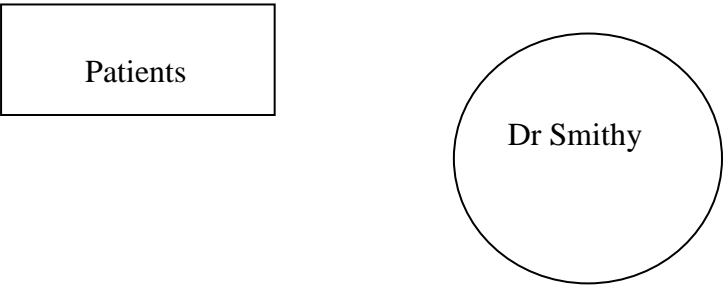
Question 1 (2 marks)

List an organizational goal and an information system objective of Dr Smithy's software solution.
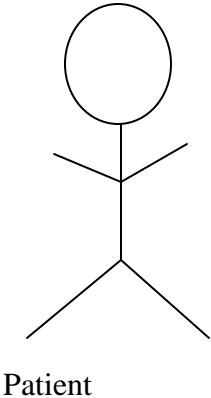
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Question 2 (4 marks)

Jason first wants to have an overview of the interaction between Dr Smithy and external entities. Complete the context diagram below.

Question 3 (7 marks)

Depict how patients interact with the software solution using a use case diagram.

Patient

Question 4 (2 marks)

Jason feels it is important to gather data from current patients of Dr Smithy to ensure the software solution meets their needs. Identify an appropriate data collection techniques that could be used with patients and justify why this technique is suitable.

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Question 5 (6 + 2 marks)

Jason wants to plan the project and estimates it will take 5 days to complete an SRS, 20 days to code the software solution, 5 days to debug, 5 days for testing the software solution, 7 days to implement the software solution and 3 days to prepare user documentation.

a. Using the information above , complete the Gantt chart below. (6 marks).

	Days							
Task	5	10	15	20	25	30	35	40
1. SRS								
2. Coding								
3. Debug								
4.Test								
5.Implementation								
6.User Documentation								

TURN OVER

b. Identify one milestone. (1 mark)

_____

_____

c. Identify the critical path. (1 mark)

_____

_____

Question 6 (4 marks)

What techniques can Jason use to record the progress of the projects and adjustments to the timeframe?

Technique 1

_____

_____

_____

Technique 2

_____

_____

_____

Question 7 (6 + 2 marks)

Jason has decided to store the patient login details in two separate arrays – ID[ ], Password[ ]. The position of the ID[ ] is the same as the position of the matching password.

Array ID[ ]

123456
234567
345678

Array Password[ ]

goAt999za
1Gptree45
guJ54s15t

    a. Write pseudocode to search for a patient ID and their password.

TURN OVER

b. Justify your choice of search technique used in part a) above.

_____

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Question 8 (4 marks)

Jason has advised Dr Smithy against using offshore cheap cloud storage. Explain two reasons why Jason would advise this.

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Question 9 (3 marks)

Recommend a back up strategy that will allow Dr Smithy to restore her data as quickly as possible in the event of a catastrophe.

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Question 10 (4 marks)

HealthDirect, an online pharmaceuticals distributor has contacted Dr Smithy proposing a partnership that includes a commission for Dr Smithy on any pharmaceuticals that her patients purchase. They require her patient personal details, so they can directly market to them as well as advertising space on her website and direct link from Dr Smithy's app to their online store.

Identify one piece of legislation that could be breached if Dr Smithy goes ahead with the partnership with HealthDirect and, explain how to protect against this.

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Question 11 (8 marks)

Describe two accidental and two deliberate threats to the security of Dr Smithy's custom website/software and suggest how each could be prevented.

Accidental Threat 1 (1 mark)

_____

Prevention 1 (1 mark)

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_____

Accidental Threat 2 (1 mark)

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Prevention 2 (1 mark)

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_____

Deliberate Threat 1 (1 mark)

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Prevention 1 (1 mark)

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_____

Deliberate Threat 2 (1 mark)

_____

Prevention 2 (1 mark)

_____

_____

SECTION C - continued
TURN OVER

Question 12 (2 + 2 + 2 marks)

Complete the evaluation strategy for Dr Smithy's software solution in the table below by filling in the blank spaces.

Time Frame	Description	Measure of Efficiency & Effectiveness
Before the custom website/software has been finalized.		**Efficiency** - Is the website/software easy to use in a reasonable amount of time? **Effectiveness** - Are the correct results produced?
	Jason ensures the solution is ready to use and operational technically.	Effectiveness - Is the software solution fully operational?
3-6 months after the implementation of the website/software.		**Efficiency** - Is the software solution easy to use? **Effectiveness** - Is the correct information being produced by the software?

END OF QUESTION AND ANSWER BOOK