



FACULTY OF SCIENCE

ACADEMY OF COMPUTER SCIENCE AND SOFTWARE ENGINEERING

MODULE	IFM02B2/IFM2B10 INFORMATICS 2B
CAMPUS	AUCKLAND PARK CAMPUS (APK)
EXAM	SSA EXAM 2021 MEMO

DATE: 2021-11-30

SESSION: 15:00

ASSESOR(S):

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INTERNAL MODERATOR:

W.S. LEUNG

DURATION: 120 MINUTES

MARKS: 100

Please read the following instructions carefully:

1. An additional 30 minutes submission time will be allowed.
2. Answer **all** questions.
3. Answer each question in its entirety before moving on to the next.
4. **Submit** your answers in a **single PDF document**.
5. This paper consists of 12 pages, excluding this cover page.

QUESTION 1

You have just been hired for your first job at a grocery store that wants to focus more on deliveries to increase sales. In this job, you are required to analyse the company's business processes and help plan their e-commerce strategy.

Using the knowledge gained during this module, answer the following questions:

- (a) List two activities and two transactions that employees would regularly do at a grocery store. Clearly state which are transactions. [4]

Solution:

activities - any two activity that does not include an exchange of value. ✓✓ E.g.

- cleaning the store
- stocking shelves
- accepting deliveries

any two transactions ✓✓:

- purchasing stock
- accepting payment
- hiring new staff

- (b) What category of e-commerce would this company fall under? [1]

Solution:

Business-to-consumer (B2C) ✓

- (c) **Merchandising** is an important part of many businesses sales' strategy, however, it can be difficult to apply to online stores. [5]

- i. Define merchandising.
- ii. How do brick and mortar grocery stores use merchandising to increase sales?
- iii. How can a grocery store achieve the same effect on their Web site?

Solution:

- i. Combination of store design, layout, and product display knowledge to promote sales ✓
- ii. Placing items that are usually bought on impulse - such as candy - near the till and at the eye-level of children ✓✓
- iii. Offer the option to add such products during checkout or to compliment items in basket ✓✓

- (d) Do groceries have an attractive **shipping profile**? Motivate your answer. [2]

Solution:

yes/no with reasonable motivation. e.g. perishable goods have a bad profile - dry goods have a good profile ✓✓

- (e) Are groceries well suited electronic commerce, traditional commerce or a combination of the two? Motivate your answer. [2]

Solution:

Regardless of choice, marks are given for logically correct argument. E.g.

- Combination because some product have strong brand recognition or are commodities. Both of which are well suited to e-commerce. While other require personal inspection e.g. fruit. ✓✓
- e-commerce because most groceries are standardized, well-known products only differentiated by price. ✓✓
- traditional commerce because people prefer to personally inspect groceries before purchasing them. ✓✓

Total: 14

QUESTION 2

- (a) The figure below shows assessment data marked up using HTML tags. Mark up the data using XML instead. [8]

```

1 <html>
2   <head>
3     <title>Assessments</title>
4   </head>
5   <body>
6     <h1>Assessments</h1>
7
8     <h2>AssessmentName</h2>
9     <h3>Date</h3>
10    <h4>Scope</h4>
11    <h5>TotalMarks</h5>
12
13    <h2>Semester Test 1</h2>
14    <h3>2021-08-26</h3>
15    <h4>Chapter 1-4</h4>
16    <h5>75</h5>
17
18    <h2>Semester Test 2</h2>
19    <h3>2021-09-09</h3>
20    <h4>All practical content</h4>
21    <h5>75</h5>
22
23    <h2>Examination</h2>
24    <h3>2021-11-02</h3>
25    <h4>All chapters</h4>
26    <h5>100</h5>

```

```
27 </body>
28 </html>
```

Solution:

2 marks for version info and "Assessments" tag.

2 marks for each assessment with correct attributes. [6 marks]

```
1 <?xml version="1.0"?>
2
3 <Assessments>
4
5 <Assessment AssessmentName="Semester Test 1">
6   <Date>2021-08-26</Date>
7   <Scope>Chapter 1-4</Scope>
8   <TotalMarks>75</TotalMarks>
9 </Assessment>
10
11 <Assessment>
12   <AssessmentName>Semester Test 2</AssessmentName>
13   <Date>2021-09-09</Date>
14   <Scope>All practical content</Scope>
15   <TotalMarks>75</TotalMarks>
16 </Assessment>
17
18 <Assessment>
19   <AssessmentName>Examination</AssessmentName>
20   <Date>2021-11-02</Date>
21   <Scope>All chapters</Scope>
22   <TotalMarks>100</TotalMarks>
23 </Assessment>
24
25 </Assessments>
```

- (b) Give two Internet connection option that would be suitable for a small business located in a rural area. [2]

Solution:

Satellite ✓ and Mesh routing (fixed-point wireless acceptable) ✓

- (c) A business spends R100 000 on an advertising campaign to attract customers to its new Web site. The advertisement is viewed by 50 000 people, 2000 of whom visit the Web site. 1000 make a purchase, and 200 become repeat shoppers. Calculate the following metrics: [6]
- Acquisition cost
 - Conversion rate
 - Retention rate

Solution:

i. Acquisition cost: $R100000/2000 = R50$ ✓✓

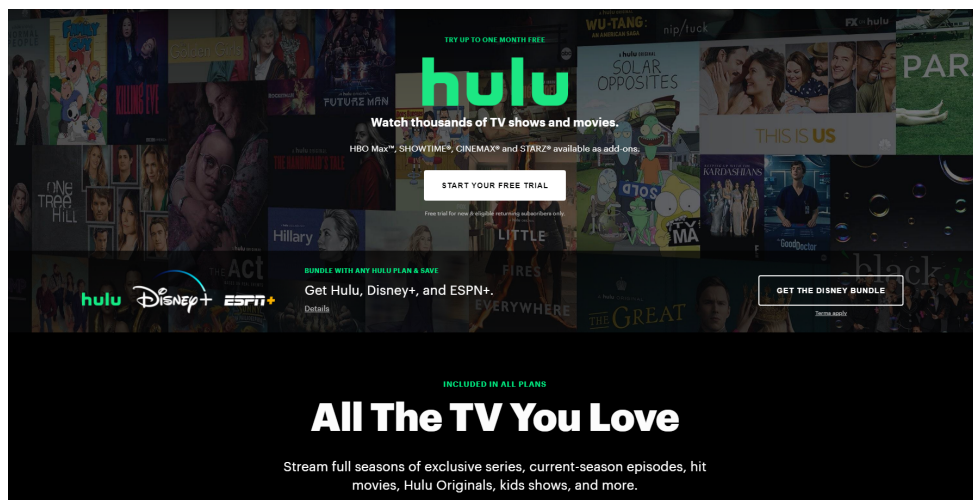
ii. Conversion rate: of 2000 visitor, 1000 became customers thus $1000/2000 = 1/2 = 0.5 = 50\%$ ✓✓

iii. Retention rate: of 1000 customers, 200 were retained thus $200/1000 = 2/10 = 1/5 = 0.2 = 20\%$ ✓✓

Total: 16

QUESTION 3

- (a) Consider the Web site in the figure below. Determine the revenue model used and provide reasons for your answer. [2]



Solution:

Digital content (Fee-for-Content)✓ - Netflix sells rights (that they own or purchase) to access content as subscription ✓.

- (b) Discuss the revenue model chosen in (a). [4]

Solution:

4 marks for any four of the following facts ✓✓✓✓:

- Firms owning written information or information rights
- Sell rights to access information they own
- Sold as subscription to access all content or
- rights to access individual items
- Embrace the Web as a highly efficient distribution mechanism
- Limitations: File size, Cannibalizing other sales, Technological barriers

- Solution: New technologies improving delivery, Companies incorporating on-line distribution into revenue strategy, Video delivery technologies becoming transparent

(c) Name **two forms of economic organisation** that the a video streaming platform could implement for content creation (i.e. creating tv shows and movies). Briefly discuss how they would implement each option.

[6]

Solution:

Any two of the following:

- Hierarchal Organisations ✓
 - Insource content creators to replace market-negotiated transactions ✓
 - Requires strong supervision and worker-monitoring elements ✓
- Network Organisations ✓
 - Form a strategic alliance (aka strategic partnership) with a 3rd-party content creators ✓
 - Coordinate strategies, resources, skill sets by forming long-term relationships based on shared purposes ✓
- Market Organisation ✓
 - Negotiate the purchase of individual content ✓
 - Impractical when transaction costs are high ✓

(d) Describe the three parts of an HTTP request message.

[3]

Solution:

- Request line: contains command, target resource name, protocol name, version number ✓
- Optional request headers: contain file type information client accepts ✓
- Optional entity body: used to pass bulk information to server ✓

Total: 15

QUESTION 4

- (a) What is a backdoor, and why do programmers build them?

[2]

Solution:

- allows users to run program without going through normal authentication procedure ✓
- to save the time it would take to login each time ✓

- (b) Give an example of an integrity violation.

[2]

Solution:

Any example of unauthorized data modification. E.g. when an e-mail message is intercepted and its contents are changed before it is forwarded to its original destination. ✓✓

- (c) Use the risk management model to decide on the appropriate action for the following threats to a car.

[4]

- i. Theft
- ii. Accident
- iii. Equipment failure
- iv. Wear and tear

Solution:

- i. Prevent or insure ✓
- ii. Insurance or backup plan ✓
- iii. Ignore ✓
- iv. Contain and control ✓

- (d) Establish a security policy for a grocery store.

[6]

Solution:

- Determine which assets to protect from which threats, e.g. tills, safe, stock ✓✓
- Determine access needs to various system parts, e.g. staff and customers need access during operation hours ✓✓
- Identify resources to protect assets, e.g. physical locks, alarms, cctv cameras, passwords for tills, keys for safe ✓✓

- (e) The value of Bitcoin has fluctuated widely since its inception. Discuss the reasons why a cryptocurrency might fluctuate more than most other currencies.

[3]

Solution:

Any three of the following:

- Cryptocurrency generally lacks stability without a country's legal system to back it ✓
- Prices are based on supply and demand ✓
- Limited use in everyday transactions ✓
- No central repository, a digital cryptocurrency balance can be wiped out by a computer crash if a backup copy of the holdings does not exist ✓

(f) Explain how a phishing attack could be used to perpetrate identity theft.

[3]

Solution:

- Attacker sends e-mail message to accounts with potential for an account at targeted Web site ✓
- Includes link that appears to be Web site login page ✓
- Actually leads to perpetrator's site so that victim's log in information can be captured and used ✓
- Spear phishing is a carefully designed phishing attack targeting a particular person or organisation ✓

Total: 20

QUESTION 5

SimplyTech is a software development company in Johannesburg made up of 50 employees (including developers, designers, analysts and project managers). The company provides its services at relatively lower costs than its competitors and promises to deliver work of higher quality than some of its competition in the industry. They started a marketing campaign to promote their services to small-to-medium enterprises in the city. LetsShopMzansi (LSM), a Start-Up online retail company, decided to seek the services of SimplyTech. LSM approached SimplyTech to develop their entire group-shopping website. Among many requirements, the website maintained a large product catalogue, had to record personal information of its clients (e.g. full names, ID numbers, phone numbers, email addresses, physical addresses, credit card details, purchase information, etc.) and process financial transactions when clients pay for the items they would like to get from LSM. SimplyTech would be in charge of developing the entire system and would thus have access to all of LSM's data and business model.

In order to convince LSM that SimplyTech would deliver on all their expectations and go beyond the call of duty, the project manager promised LSM's IT Manager that the system would be completed within 30 working days, that it would have a unique design, would be absolutely secure and reliable to LSM's clients.

After having made all of these promises, the project manager called you (the lead developer at SimplyTech) to discuss the development of the system. After having told you of all of the promises, the project manager ordered you to make sure the system gets developed quickly and that to save time you should do the following:

- Copy the design of a similar company based in the United States,
- Not use any data encryption techniques to keep personal information secure since that would take so much time,
- Not get accredited security digital certificates for the website as that would reduce the amount of profit that SimplyTech will make on the project,
- Hard code any part of the system just so it is much faster to deliver to the client,
- Not place any comments in the code to force LSM to always go back to SimplyTech if ever they need an update, and
- Leave backdoors on the system's server just so SimplyTech keeps access rights to the system after having sold it to LSM.

The project manager's reasoning was that the marketing campaign was very successful, and he had already committed to the same promises to 50 other clients, so you as the lead developer had no choice but to do it.

- (a) As an IT professional, would you carry out your boss's instructions? Justify your answer by referring to any professional code of ethics that you have learned during the semester. Include in your discussion if you think IT professionals need to have a code of ethics and the reasons for your choice. [10]

Solution:

- No (No other answer accepted) ✓

- Yes - A code of ethics is needed to ensure that everyone behaves in a responsible manner and may be disciplined for mal-conduct. ✓✓

No marks for writing out code, without application to case study (1 mark per valid discussion point, Max 8 marks)

Student may use own words. Answer must relate to the case study. May also refer to the ACM Code of Conduct and/or the Software Engineering Code of Ethics.

Example Reasons:

- Because IT professionals are trusted by society and must be responsible for their actions.
- As professionals, we have a duty to maintain the highest standards of professionalism in our work, while at the same time still acting in the public interest.

ACM Code of Conduct Section 1 Imperatives:

- Contribute to society and human well-being
- Avoid harm to others
- Be honest and trustworthy
- Be fair and take action not to discriminate
- Honour property rights including copyrights and patent
- Give proper credit for intellectual property
- Respect the privacy of others
- Honour confidentiality

Software Engineering Code of Ethics:

- Public:
 - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.
- Client and Employer:
 - Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.
- Self:
 - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.

- Product:
 - Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.
- Judgement:
 - Software engineers shall maintain integrity and independence in their professional judgment.
- Profession:
 - Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.
- Management:
 - Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.
- Colleagues:
 - Software engineers shall be fair to and supportive of their colleagues.

Total: 10

QUESTION 6

- (a) Name three (3) ways of maintaining state in an ASP.Net Web Application.

[3]

Solution:

- Session Variables ✓
- Cookies ✓
- assign users temporary numbers ✓

- (b) Define business intelligence and why it is an important part of running a business, along with examples of where it would apply.

[4]

Solution:

Business intelligence (BI) is a technology-driven process for analysing data and presenting actionable information which helps executives, managers and other corporate end-users make informed business decisions ✓. BI encompasses a wide variety of tools, applications and methodologies that enable organisations to collect data from internal systems and external sources prepare it for analysis ✓, develop and run queries against that data and create reports ✓, dashboards and data visualisations to make the analytical results available to corporate decision-makers, as well as operational workers ✓.

1. Operational level (day to day running). ✓
2. Managerial level (strategic and planning level). ✓
3. Both management facing, some can be user-facing. ✓

(c) Explain in detail how you would implement a persistent shopping cart in a ASP.Net Web Application. [5]

Solution:

A discussion on the creation of a persistent shopping cart. ✓✓.

- database table to store items per user. ✓
- data retrieved each time a user logs in. ✓
- data is only removed from the table if the user checks out or removes items from the cart. ✓

(d) Name the two (2) page extensions that make up a webpage in an ASP.Net Web Application. [2]

Solution:

- .ASPX ✓
- .ASPX.CS or ASPX.VB ✓

(e) Find and correct the errors in the following code. [11]

```

1
2 CREATE TABLE [dbo].[SystemUser] (
3     [RevId]      INT          IDENTITY (1, 1) NOT NULL,
4     [UserId]     INT          NOT NULL,
5     [ProdId]     INT          NOT NULL,
6     [RevDate]    DATE         NOT NULL,
7     [RevStars]   INT          NOT NULL,
8     [Review]     VARCHAR (MAX) NOT NULL,
9     PRIMARY KEY CLUSTERED ([RevId] ASC)
10 );
11
12 public bool EditReview(Review rev)
13 {
14     var Rev = (from r in db.ProdReview
15                 where r.RevId.Equals(rev.Review) &&
16                      r.Active.Equals(rev.Active)
17                 select r).FirstOrDefault();
18
19     foreach (Review r in Rev) (if (Rev != null))
20     {
21         Rev.UserId = rev.UserId;
22         Rev.ProdId = rev.ProdId;
23         Rev.RevDate = rev.RevDate;
24         Rev.RevStars = rev.RevStars;

```

```
25 Rev.Review = rev.Review
26 }
27
28 db.ProdReviews.InsertOnSubmit(Rev);
29 Try
30 {
31 db.SubmitChanges();
32 return Rev; true
33 }
34 catch (IndexOutOfRangeException ex)
35 {
36 ex.GetBaseException();
37 return null; false
38 }
39 }
```

Solution:

```
1 public bool EditReview(ProdReview rev)
2 {
3     var Rev = (from r in db.ProdReviews
4                 where r.Revid.Equals(rev.Review)
5                 select r).FirstOrDefault();
6
7     Rev.UserId = rev.UserId;
8     Rev.ProdId = rev.ProdId;
9     Rev.RevDate = rev.RevDate;
10    Rev.RevStars = rev.RevStars;
11    Rev.Review = rev.Review;
12
13    try
14    {
15        db.SubmitChanges();
16        return true;
17    }
18    catch (IndexOutOfRangeException ex)
19    {
20        ex.GetBaseException();
21        return false;
22    }
23 }
```

Total: 25

— End of paper —