



**AUSTRALIAN COMPUTER SOCIETY**  
(Incorporated in the A.C.T.)

**Diploma of Information Technology**

**June 2008**



**Complete this cover sheet and attach securely to the front of your answers.**

FAMILY NAME .....

GIVEN NAME(S) .....

ACS EXAMINATION NUMBER \_\_\_\_\_

**PAPER: Systems Analysis**

	<b>Max. Marks</b>	Examiners Marks
<b>Part A: attempt one (1) question.</b>	<b>40</b>	
Question 1. ICAA5158A Translate the Business Needs into Technical Requirements.	40	
Question 2. ICAA5158A Translate the Business Needs into Technical Requirements.	40	
<b>Part B: attempt all (3) questions.</b>	<b>12</b>	
Question 3. ICAA5054A Validate Quality and Completeness of Design Specifications.	4	
Question 4. ICAA5151A Gather Data to Identify Business Requirements.	4	
Question 5. ICAP5039A Match the IT Needs with the Strategic Direction of the Enterprise.	4	
<b>Part C: attempt any three (3) questions.</b>	<b>48</b>	
Question 6. <i>Not relevant to a specific Unit of Competency.</i>	16	
Question 7. <i>Not relevant to a specific Unit of Competency.</i>	16	
Question 8. <i>Not relevant to a specific Unit of Competency.</i>	16	
Question 9. <i>Not relevant to a specific Unit of Competency.</i>	16	
	Total Marks	



**AUSTRALIAN COMPUTER SOCIETY**  
(Incorporated in the A.C.T.)

**Diploma of Information Technology**

**June 2008**

**SYSTEMS ANALYSIS**



**Time allowed :    Reading    15 minutes**  
**Writing     3 hours**

1. **This exam paper is based on a workplace scenario (or case study). Candidates should have read and understood the case study before attempting this exam.**

**For reference, a copy of the case study is provided at the end of this paper.**

2. **Candidates must obtain a minimum of 50 marks to pass this paper.**

**At least 15 marks must be obtained in Part A. Candidates who obtain less than 15 marks in Part A will be given a maximum of 40 marks for the paper.**

**At least 2 marks must be obtained for each and every questions in Part B. Candidates who obtain less than 2 marks for any question in Part B will be given a maximum of 40 marks for the paper.**

**Candidates should schedule their time according to the marks allocated to the questions and sub-questions.**

3. **Candidates should write their Exam Number at the TOP of every answer page.**

4. **All answers must be written in INK and use only one side of the paper.**

**Candidates should write clearly and neatly.**

5. **Candidates may bring to this examination the following; pens, pencils and other writing and drawing equipment, plus any paper-based materials either written or printed.**

**Candidates must not bring to this examination electronic devices including, but not limited to; calculators; notebook, handheld or PDA computers; mobile or cellular telephones; or other data storage and/or communications devices.**

## **PART A – Case Study**

**[40 of 100 marks]**

Attempt **either question 1 or question 2** – questions are of equal value.

For reference purposes, a copy of the “Jobs For You” case study is provided at the end of this paper.

### **Question 1**

**[40 marks]**

For activities within the Jobs For You Workplace Scenario, particularly as relevant to the Sales operation (Business development and Job orders), and using **structured** systems analysis and design techniques:

- a) Draw a levelled data flow diagram and briefly describe the major processes.  
[20 marks]
- b) Draw a data model (ie. entity relationship diagram or similar). Ensure relationships and relationship cardinalities are clearly identified.  
[20 marks]

Annotate your diagram with explanatory notes where necessary.

**Note** that a core competency is attached to Question 1 and it is not possible to pass the Systems Analysis paper without a pass in either Question 1 or Question 2.

**OR**

### **Question 2**

**[40 marks]**

For activities within the Jobs For You Workplace Scenario, particularly as relevant to the Sales operation (Business development and Job orders), and using **object oriented** systems analysis and design techniques, draw appropriate diagrams (eg. object or class diagrams, interaction or sequence diagram, etc.)

Ensure the diagrams clearly identify:

- a) links and relationships between object classes. [20 marks]
- b) attributes of object classes. [10 marks]
- c) methods (ie. services) available to object classes. [10 marks]

Annotate your diagram with explanatory notes where necessary.

**Note** that a core competency is attached to Question 2 and it is not possible to pass the Systems Analysis paper without a pass in either Question 2 or Question 1.

## **PART B – Competencies**

**[12 of 100 marks]**

Attempt **all three (3)** of the following questions.

For reference purposes, a copy of the “Jobs For You” case study is provided at the end of this paper.

**Note** that, in Part B, a core competency is attached to Question 3 and another core competency is attached to Question 4 and another core competency is attached to Question 5. It is not possible to pass the Systems Analysis paper without a pass in Question 3 and a pass in Question 4 and a pass in Question 5.

### **Question 3**

**[4 marks]**

Basing your answer on the Jobs For You Workplace Scenario, explain all of the issues in validating quality and completeness of design specifications including the determination of audit criteria, resolving all aspects of a final system, then reviewing and verifying with the contract and specifications.

### **Question 4**

**[4 marks]**

Basing your answer on the Jobs For You Workplace Scenario, explain all of the issues in identifying key information sources to identify business requirements, gather data through formal processes, ensure analysis is accurate and complete and gain consensus.

### **Question 5**

**[4 marks]**

Explain all of the issues in evaluating current business strategy, evaluating the impact of changes on the strategy and developing action plans.

## **PART C – Analysis Theory**

**[48 of 100 marks]**

Attempt only **THREE (3)** of the following questions –questions are of equal value.

### **Question 6**

**[16 marks]**

- a) Discuss the advantages and disadvantages of Computer-Assisted Software Engineering (CASE) tools. [4 marks]
- b) Discuss horizontal and vertical integration of CASE tools. [4 marks]
- c) Choose a proprietary CASE tool and explain what it does. [4 marks]
- d) Describe a tool that is of assistance in Project Management. [4 marks]

**Question 7****[16 marks]**

- (a) Discuss issues for each of the following when documenting the development of a project:

Documentation standard; [2 marks]

Models; [2 marks]

Data elements; [2 marks]

Configuration management; and [2 marks]

Project management. [2 marks]

- b) What should occur when changes to a system specification are desired midway through system development? [6 marks]

**Question 8****[16 marks]**

Write an essay explaining, comparing and contrasting modelling techniques for structured analysis and design (such as data flow diagrams and entity relationship diagrams) and of object-oriented analysis and design (such as models described in the UML).

**Question 9****[16 marks]**

- (a) Explain issues in interviewing as a method of gathering information, including an interview plan, interview structure, approaches during an interview and following up an interview. [10 marks]

- (b) Explain each of the following methods of gathering information:

Questionnaires [2 marks]

Observation [2 marks]

Prototyping [2 marks]



Diploma of Information Technology

## Workplace Scenario for June 2008 Examinations

Examinations leading to the ACS Diploma of Information Technology qualification are based upon a scenario, or detailed case study, reflecting a *realistic* work environment. The same scenario is used for every examination in a particular offering. The scenario relevant to a particular offering is published on the ACS web site immediately following completion of the previous offering.

### Jobs For You

**JOBS FOR YOU** is an employment agency that specialises in filling short-term labour requirements. The company maintains a list of people who are available for casual employment and seeks to find other companies who need extra employees on a casual hire basis. These companies become clients of JOBS FOR YOU and are invoiced weekly. JOBS FOR YOU pays the employees directly.

#### Stakeholders

JOBS FOR YOU has three types of stakeholders:

**Clients:** these are external companies who require one or more additional employees for a specific period of time. These needs arise for various reasons that make it more desirable to hire people for a short period through an agency than to recruit new full-time staff.

Some of these reasons include:

- seasonal work, like fruit-picking, where the employees are required only for a short period of time – and where the employees themselves may not wish to work for more than a week or two anyway;
- project-based work such as the construction of a new road or factory, where the employees are required for the life of the project but not afterwards;
- to save on the cost and effort of having an in-house human resources department;
- to save on the costs and administration of hiring employees directly. For example, if a company has less than a certain number of employees directly hired it can be exempted from paying payroll taxes. Additionally, a labour hire company guarantees supply of skilled workers. If an employee is sick or on leave the labour hire company will find a replacement for the period of time the regular employee is away.

**Employees:** these are the people who the agency hires and then place out to client sites. The employees are given assignments based on the vacancies that are available and their skills. The employees are advised that work cannot be guaranteed and that their placements are as casual employees. They are not permanently employed by either JOBS FOR YOU or the client. This means they are paid only while they are working in a client position.

Although placed on a client site, courts have determined that the employee works directly for the labour hire company. This determination was reached by the courts where employees have been injured on client sites. The labour hire company has been held responsible because the court deemed that they were the direct employer and have a duty to inspect client sites for safe working environments.

Many positions filled by these employees are protected by trade unions - an organisation of workers who have banded together to achieve common goals in key areas such as wages, hours, and working conditions, forming a cartel of labour. The trade union, through its leadership, bargains with the employer on behalf of union members (rank and file members) and negotiates labour contracts with employers. This may include the negotiation of wages, work rules, complaint procedures, rules governing hiring, firing and promotion of workers, benefits, workplace safety and policies. The agreements negotiated by the union leaders are binding on the rank and file members and the employer and in some cases on other non-member workers (Wikipedia).

**Staff:** these are the internal employees of Jobs For You who work for Jobs For You, the people who make the agency run. These includes sales staff who find new business opportunities, staff who run branches and interview new employees and place employees to vacancies, the payroll and accounts team, I.T., marketing and other roles necessary for a business to function.

## Business development

Sales staff promote JOBS FOR YOU's offerings. They target companies who perform heavy manufacturing work and require skilled tradespeople. This type of business is desirable because the agency charges the client as a percentage of the employee's pay rate. This means that the more skilled a position, the higher the employee will be paid and thus the greater margin the agency receives.

However, it can be difficult to fill such roles because the skilled tradespeople needed may not be available or may be attracted elsewhere to even higher paying positions.

Consequently, JOBS FOR YOU also aim to provide large volumes of unskilled workers to factories and warehouses where the work is low-skilled and repetitive and does not require any special abilities. It is easier to find employees to take on these roles but by contrast the margins are lower because the pay is low. Additionally, because employees are typically supplied in large numbers there is a larger amount of administration work required in terms of advertising, interviewing, processing timesheets, and handling worker's compensation claims when someone is injured. The General Manager of JOBS FOR YOU wonders if this type of business really is profitable and if it is worth the effort.

JOBS FOR YOU would like to branch into mining, where pay rates are especially high and thus margins are better, but it does not have business development staff internally who have mining experience and can forge relationships with potential mining clients. Additionally, JOBS FOR YOU are considering branching into "white collar" administration recruitment where there are far less worker's compensation and safety concerns. However, they fear this deviation from their traditional trades background may make them appear to be unfaithful to their long-term loyal employees.

When a client is interested in using JOBS FOR YOU's services, the sales staff calculate and quote the rates they will charge the client. This is calculated using an Excel spreadsheet in the following manner:

1. The position is classified based on the work that will be performed and any required degree of experience. For instance, the position might be "Level 1 boilermaker" or "Storeperson" or "C10 Labourer" or many other things. This position describes the basic role being performed (*boilermaker, storeperson, labourer*) and may include a skill grading or level ("Level 1", "C10") where this is appropriate.
2. A relevant *industrial instrument* is found. This is a stated agreement that dictates the minimum pay rate and conditions required by law for all the employees covered by that agreement. All industrial agreements are published on one of several government web sites.

Industrial instruments cover many different types of agreements. Some are known as *awards* which are set by governments in conjunction with trade unions. Others are collective agreements or workplace agreements where the employees at a specific company have negotiated with management, usually with trade union assistance, to determine the pay rates and conditions for the employees of that company. Individual agreements also exist but usually these are identical for each employee at a workplace. All together these various agreements are known as industrial instruments and form the basis for how people are paid.

The conditions in an industrial instrument might be that an employee can expect to be paid a specific amount of money for each hour they work up to eight hours per day and a total of 38 hours per week. If they work more hours on any day or over the course of the week it is considered to be *overtime* and they will receive an extra 50% (“time and a half”) for the hours above eight per day or 38 per week. If they work on weekends they will be paid twice the ordinary hourly rate (“double time”). Most industrial instruments contain clauses to provide extra payments for overtime work, and stipulate the number of hours which must be worked before overtime rates apply.

Some agreements may state that the first eight hours can be anytime during that day. It does not matter what actual hours they work so long as they do not exceed the number of hours worked. Other agreements state that normal pay rates only apply in daylight hours and if the person works a night shift they are to be paid time and a half for that entire shift even though they may still be working eight hours or less in total for that day.

Most agreements state employees are to be given a meal break for every five straight hours they work. Some agreements say the employees are to be paid for meal breaks whereas others do not.

Some agreements add additional payments depending on the work performed. For instance, if the employee is working with dirty animals at any time, the agreement may stipulate they are to receive an extra allowance of several dollars for each hour or for each shift they are with the animals.

There are many other variations and conditions and every agreement has to be read properly to ensure the legally-obliged pay rates are understood. This is called *award interpretation*.

3. Once the pay rates for time and allowances are known, the sales staff must then add additional fees and levies which are a percentage of the pay rate. These include
  - fees which are remitted to the government such as payroll tax which is a constant percentage value.
  - insurance fees like worker’s compensation which is a variable percentage rate based on the nature of the work performed and the risk of injury (so, an office administrator has a lower worker’s compensation fee than an underground coal miner, for example).
  - additional charges to cover the cost of any protective clothing issued by the agency to the employee (eg safety glasses, high-visibility vests)
  - superannuation payments, paid directly to the employee’s retirement fund provided they earn above a specific threshold (presently \$430) each month.
  - a profit margin. This is a percentage of the pay rate and is where the agency actually makes its money. JOBS FOR YOU strive for a minimum margin of 12% but with the General Manager’s approval they will go down to 8% if the client is very large and they are facing competition.

The final figure determined by the sales staff is the charge rate.

A letter is written to the client that lists the hourly rates JOBS FOR YOU will charge for ordinary time and overtime hours, by classification. This listing might look something like:

<b>Classification</b>	<b>Ordinary hours</b>	<b>Time and a half</b>	<b>Double time</b>	<b>Double time and a half</b>
Level 1 Boilermaker	\$27	\$40.50	\$54	\$67.50
Level 2 Boilermaker	\$30	\$45	\$60	\$75

The client is not given the award pay rates.

## Job orders

If the client accepts the rates and places an order for employees, the recruitment staff at JOBS FOR YOU then become involved. They are responsible for filling the order with suitably qualified employees. They will begin by searching their database of employees. Ideally, they will have employees on file who are able to perform the work. They will call these employees and offer the work to them.

If JOBS FOR YOU do not have enough suitable employees on file who are available to work they will advertise in newspapers. Applications are screened and people who appear suitable are asked to come in for an interview and an induction process. Once accepted and depending on the nature of the work, the new employee may be provided safety clothing.

New employees are entered into the database so they can be found in future searches.

## Payroll and billing

Once the employees are working on the client site they will submit a timesheet each week listing the time they began working and the time they finished working each day. JOBS FOR YOU require this timesheet to be signed by the employee and also signed by a representative of the client.

These timesheets are passed to the JOBS FOR YOU payroll department. For each timesheet, payroll staff must calculate, according to the industrial instrument, how many hours the employee will be paid for ordinary time and how many for overtime, if applicable. This calculation is known as award interpretation and is a cumbersome task with a high potential for error.

The hours and pay rates are entered into JOBS FOR YOU's payroll system and employees are paid each week. The calculations are passed on to the accounts department who then enter the same hours, but with charge rates, into JOBS FOR YOU's invoicing system. Invoices are sent to clients each week.

## System improvements

JOBS FOR YOU are concerned that their overheads are far too high and wish to reduce costs and gain efficiencies through improved use of technology.

Additionally, JOBS FOR YOU's management do not believe their current financial systems give them enough information to be able to make critical business decisions.

JOBS FOR YOU spent time identifying possible directions they could go in. These include

1. JOBS FOR YOU presently use an MS Access database to store employee information. This is the database that the recruitment staff work with when finding employees to fill a

job order. Being an Access database it suffers corruptions from time-to-time and needs to be compacted and repaired before it can be used again.

Additionally, it does not perform well over a wide area network. Therefore JOBS FOR YOU have a copy of the same database design, but with different data, running within each branch. JOBS FOR YOU believe the database needs to be redeveloped using a much more robust and centralised system. They also wish for branches to be able to view each other's employees so a branch can make use of employees registered with a nearby branch if needed. At the moment, branches do not have any access to another branches data and may be advertising and interviewing needlessly. Not only would the company benefit from this but the employees would also; at present they are potentially missing employment opportunities at nearby branches.

JOBS FOR YOU's management, however, do not want client data to be shared among the branches. Staff turnover is fairly rapid within the recruitment industry and management do not want any sales staff member having access to the company's full client list in case they take this away with them when and if they leave the company.

2. The rates calculations are performed in an Excel spreadsheet. This spreadsheet is updated periodically to add additional fees and levies or to modify existing ones – such as updating the insurance premium every year. However, because sales staff tend to keep re-using spreadsheets on their laptops there is no certainty they are working with the most up-to-date formulae and inclusions held in the master rates calculator spreadsheet stored on the company file server.

Additionally, there is no certainty that completed rates calculation spreadsheets are being centrally saved. Often when JOBS FOR YOU are renegotiating rates with a client they have trouble locating the original spreadsheet and working out how the existing charge rates were determined. JOBS FOR YOU believe the rates calculator would be best implemented as an internal web-based application with a back-end database. This would ensure the latest code is always used and that rates are centrally stored.

3. The payroll team are busy all week every week. The payroll process takes a lot of time and there are four staff members devoted to it. If the company grows and takes more clients it will also need to take on more payroll staff to cope.

JOBS FOR YOU feel they must be able to automate much of this work and thereby reduce the number of staff. Initially they thought they could automate the timesheet data entry by introducing time clocks on sites, with employees swiping a card when they start and when they finish work each day. After speaking with the payroll team, management realised that only about 20% of the payroll work is actual data entry; 80% of the effort is expended on the award interpretation of each and every timesheet.

Management are certain that if they can automate award interpretation they will make huge efficiency gains and cost savings. What they envision is to have a timesheet entry system which takes the employee start and stop hours just as written on the paper timesheet. The system will then determine the breakup of the employee's time into ordinary hours and overtime hours according to the relevant industrial instrument. The hours could then be automatically fed into both the payroll system and the invoicing system (with pay and charge rates included respectively.)

Not only would this create an immediate saving but it would also safeguard against error. Presently mistakes in interpretation are highlighted when clients query their invoice. JOBS FOR YOU staff must then inspect the invoice and check the original timesheets and rework their calculations to identify any mistakes. Sometimes the mistakes are that

JOBS FOR YOU has overpaid an employee. The staff then have to decide whether to absorb this cost or to ask the employee to return the overpayment.

4. Management would also like to set up a web-based intranet site that would draw upon billing data to graph the sales figures each week by branch and by client. This would allow sales staff to see quickly where they may be losing business.

At present, the financial controller produces a report but it shows only sales by branch due to the manual effort required to produce anything more detailed. Staff can identify if their branch is increasing or decreasing in sales overall, but they cannot identify if their sales to any individual client are dropping.

5. JOBS FOR YOU have recently been involved in several court cases where employees claimed they had been unfairly terminated. JOBS FOR YOU used several defences in different cases. In one case they claimed the employee had not been terminated because the nature of a labour hire company like theirs is that the assignments are only short term and as clients require. Their defence was that they had explained to the employee there was no guarantee of work.

In a second court case, JOBS FOR YOU defended their decision not to use the employee anymore and made reference to diary notes they store within their database. These diary notes are used to record each phone call and interaction with the employees. JOBS FOR YOU argued that they had offered work to this employee on many occasions and the employee had continually refused because the client site was too far away or they felt the pay was insufficient or because on one occasion they were too drunk to go to work that day. The court was satisfied with JOBS FOR YOU's defence based on their submitting a record of interaction with the employee.

Word of this spread and some employees became concerned by what JOBS FOR YOU's files on them may say. They appealed to national privacy legislation to view their own records.

This caused management some concerns. They believe they must instruct the recruitment staff to be very careful in everything they record in the database and not to write anything rude or insulting because it is always possible that the employees might read it.

Additionally, although the court was satisfied with the diary notes, the management realised they had no evidence to prove the diary notes had not been tampered with should the court have considered this. Management recognise that they must rework the database such that the current single free-text field for diary notes be recorded in a better way, with the system prohibiting historical entries being edited or deleted.

Management do want certain information to be coded in the diary notes and are trying to work out how best to do this without arising any suspicion. Specifically, they want to record that an employee is never to be hired again if he or she proved especially difficult to work with. Yet, they do not want this comment to be explicitly entered into the diary notes. They are uncertain how to instruct recruitment staff to record this important note such that they can recognise it internally but yet for it be meaningless to the employee or any other person reading it.

6. JOBS FOR YOU use a Windows XP desktop computer with 1 GB RAM and a 500 GB IDE hard drive for file storage. They find that the system slows down when five or more people are accessing file shares at the same time. They have been advised to buy a new server but they do not understand how this would actually help solve the problem.