

Answer Sheet

Name: _____

COMPSCI 111S2C

Introduction to Hardware and Software [10 marks]

1. Which of the following are parts of the **operating system**? (3 marks)
(list all that apply)

- a) Flash memory
- b) Kernel
- c) File manager
- d) Keyboard
- e) I/O Controller

File manager (c), I/O Controller (e), Kernel (b)

2. This is the same system board used in Lab02.

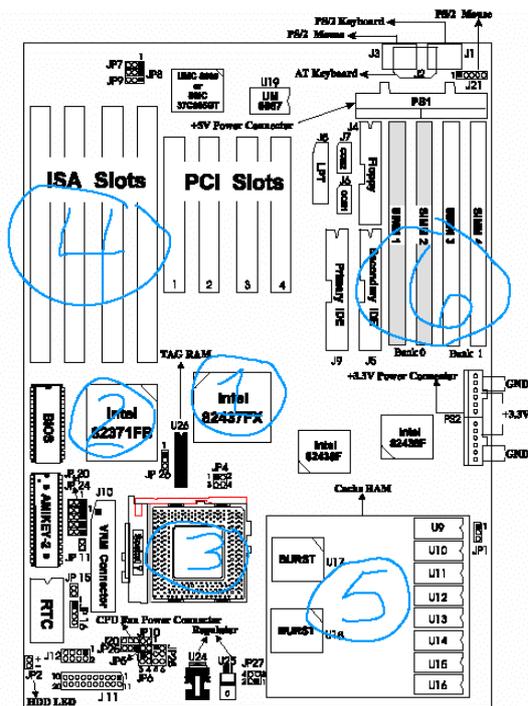


Figure 3-1. TS54P AIO Mainboard Layout

Which number corresponds to **RAM**? (2 marks)

6

3. Each hardware item in the left column of the table below has ONE correct statement written about it in the right column. Choose the BEST match for each. Place the matching number in the centre column. (5 marks)

Answers:

RAM	1	1. Volatile Memory
ROM	4	2. "Brain" of the Computer
Magnetic Tape	3	3. Sequential Access Secondary Storage
Magnetic Floppy Drive	5	4. Non Volatile Memory
CPU	2	5. Random Access Secondary Storage

Representation of Information [10 marks]

4. Convert the following number from decimal to binary. **78** (4 marks)

Show your workings

Method II:

	64	32	16	8	4	2	1
	2^6	2^5	2^4	2^3	2^2	2^1	2^0
78							
-64	1						
14				1			
- 8							
6					1		
- 4							
2						1	
- 2							
0							

1 0 0 1 1 1 0

OR

Method II:

	Remainder
78/2	0
39/2	1
19/2	1
9/2	1
4/2	0
2/2	0
1/2	1

Remember to read from bottom up:

1 0 0 1 1 1 0

5. Add the following 2 binary numbers. Give the answer as a binary number. (4 marks)

$$\begin{array}{r} 10110 \\ + 11011 \\ \hline \end{array}$$

carry	1	1	1	1		
		1	0	1	1	0
+		1	1	0	1	1
	1	1	0	0	0	1

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6. If the ASCII code for “m” is 109, what is the ASCII code for “p”? (2 marks)

The alphabet is represented in a sequential manner in ASCII encoding therefore:

m=109, n=110, o=111,

p=112

Applications [20 Marks]

7. Given the following Boolean expressions, indicate if they evaluate to TRUE or FALSE:
Circle the correct answer: (3 marks)

a) $\text{OR}(\text{SUM}(1,2,3)=5, 3<7)$

True False

b) $\text{AND}(5<6, \text{NOT}(2>3))$

True False

c) $\text{OR}(2<1, 2>4)$

True False

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Use this spreadsheet to answer the next 3 questions found on the opposite page. This spreadsheet contains a table of return airfares on Singapore Airlines and lists purchases of Economy Class Tickets for 4 customers.

	A	B	C	D	E	F	G
1							
2	Return Fares by Destination				Tax Rate:	0.045	
3			Business	First			
4		Economy	Class	Class			
5	Singapore	\$1,500	\$3,200	\$4,500			
6	London	\$2,500	\$4,100	\$6,100			
7	Frankfurt	\$3,000	\$5,400	\$6,800			
8	Tokyo	\$2,500	\$4,800	\$5,500			
9							
10							
11		Economy					
12	Person	Tickets	Destination	Cost	Taxes	Total Cost	
13	Mark	2	London	\$5,000	\$225	\$5,225	
14	Sally	1	Singapore	\$1,500	\$68	\$1,568	
15	Jarvis	4	Tokyo	\$10,000	\$450	\$10,450	
16	Arthur	2	Singapore	\$3,000	\$135	\$3,135	
17	Li	3	Frankfurt	\$9,000	\$405	\$9,405	
18					Total Sales:	\$29,783	
19							
20							

8. Column D contains the total ticket costs before taxes, for each person. All tickets are Economy Fare tickets. Use the VLOOKUP function and **write a formula for cell D13**. Remember to adjust the value based on the number of tickets purchased (column B). This formula **must work** when filled down to cell D14. (6 marks)

<code>=VLOOKUP(C13,\$A\$5:\$D\$8,2,FALSE)*B13</code>
--

9. Column E, labelled “Taxes”, contains the taxes for the total ticket cost (column D). It uses the tax rate found in cell F2. **Write a formula for cell E13** that will calculate the taxes. This formula **must work** when it is filled down. (4 marks)

<code>=F\$2*D13</code>

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10. If I put the following formula in cell F13

$$=D13+\$E\$13$$

and fill this formula down to cell F14, what values appear in F13 and F14? **If either of the values differ** from the value shown in the spreadsheet above **explain** why. (3 marks)

Value in F13: \$5,225

Value in F14: \$1,725

The value in F14 differs because the formula uses an **absolute** cell location \$E\$13. When filled down to F14 the new formula will change D13 to D14, but **will not** change E13 to E14. It will be:

$$=D14+\$E\$13$$

In order to make this work correctly we need to use relative locations in cell F13: (i.e. remove the dollar signs)

$$=D13+E13$$

Microsoft Word

11. State two reasons why style sheets in Word are beneficial. (2 marks)

- They provide consistency in our document
- It is easy to make many changes to many parts of our document at once

12. Assume I have my formatting marks turned on. What does the following character mean in your word document? (2 marks)

¶

Paragraph

Name: _____

2D Graphics [10 Marks]

13. Name one image compression algorithm discussed in class and state whether it works better for photographs or for vector graphics? (4 marks)

GIF – better for vector graphics
or
JPEG- better for photos

14. How many **bits**, and how many **Bytes**, are required to store a 16 colour bitmap image that is 100 pixels high and 10 pixels wide? (6 marks)
(Show workings for partial credit)

4 bits are needed for 16 colours ($2^4=16$)
 $4 \times 100 \times 10=4000$ **bits** are needed to store this image
There are **8** bits in a Byte so:
 $4000/8 = 500$ **Bytes**

bits: 4000

Bytes: 500

JAVA [50 marks]

General Questions (10 marks)

15. What is the difference between the Java applet window and the Java console window?

The java console window is text based, ideal for quick input/output or arithmetic programs. The java applet window is graphical, it can also be plugged into Internet browsers.

16. Give an example of how to declare constants.

```
final double GST = 12.5;
```

17. Why is it good programming practice to use constants?

The use of constants reduces the chance of accidentally changing the value of a variable. For example the variable `double GST = 12.5;` would not be expected to change throughout the duration of the program so we make it constant, to ensure there is no chance that we accidentally change its value. By declaring constants as upper case in the program, they are easy to identify and make the program more readable.

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18. Why should you enclose your expressions in round brackets when following a string? Give an example.

If the '+' occurs after a string, Java will concatenate everything that follows. For example `System.out.println("5 + 2 = " + 5 + 2);` will give: `5 + 2 = 52`. If we want to do addition following a string, the expression must be enclosed in brackets, so Java evaluates the contents of the brackets first, doing the addition before concatenating the resulting value onto the String. For example `System.out.println("5 + 2 = " + (5 + 2));` gives: `5 + 2 = 7`

19. List two good programming practices that should be followed to ensure your program is easy to read and understand.

Any two of: Indentation, documentation, meaningful variable names, use of constants where appropriate, plenty of white space, brackets around expressions

Expressions (10 marks)

20. What is the output from the following code extract?

```
final int M = 2;  
final int C = 10;
```

x

```
int x = 7, y = 2;
```

Y

```
x = y + x / y;
```

```
y = M + 2 * x;
```

```
y = y + 1;
```

```
System.out.println("x = " + x + ", y = " + y);
```

Answer:

x = 5, y = 13

Debugging (10 marks)

21. Carefully examine the following code fragment. Identify and correct **10** of the errors. Circle the errors and make the appropriate changes. *Model answers only, other solutions can also get full marks*

```
/* Declare and init variables
/* Declare and init variables */
final int AREA=2;
int area=2;

int height=0;length=0, width;
int height=0, length=0, depth=0, width=0;

volume=0;
int volume=0;

System.out.println("Please enter the height in metres: ");

height=Keyboard.readDouble();
height=Keyboard.readInt();

System.out.print("Please enter the length in metres: ");
System.out.print("Please enter the height in metres: ");

length=Keyboard.readInt();

System.out.println("Height is: " + height + "width is " + width +
length is + length);
"length is " + length);

System.out.println("Please enter a depth: ");
System.out.println("Please enter a depth: ");

depth=Keyboard.readInt();
//depth declared and initialised at top

AREA=width*length;
area = width * length; //AREA changed to variable at top

System.out.println("area: " + area + sqm);
System.out.println("area: " + area + "sqm");
```

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Output (10 marks)

22. Consider the following program:

```
int balance=0, deposit=0;
int bonus=100;

System.out.println("Your balance is: $" + balance);
System.out.print("Enter the amount you would like to deposit: $");
deposit=Keyboard.readInt();

balance = deposit + balance;

System.out.print("Enter another deposit: $");
deposit=Keyboard.readInt();
balance = deposit + balance;

if(balance > bonus){
    System.out.println("Congratulations! Bonus reached!");
    balance=balance+bonus;
}
else {
    System.out.println("Updated your balance...");
}

System.out.println("Your balance is now: $" + balance);
```

Complete the output (**add any additional lines** of output that occur) if the user types in:

(a) 50 and 59

```
Your balance is: $0_____
Enter the amount you would like to deposit: $50_____
Enter another deposit: $59 _____
Conratulations! Bonus reached!
Your balance is now: $209
```

(b) 20 and 40

```
Your balance is: $0_____
Enter the amount you would like to deposit: $20_____
Enter another deposit: $40_____
Updated your balance...
Your balance is now $60
```

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The Applet Window (10 marks)

23. Look at the following code fragment carefully:

```
g.drawLine(20,100,140,50);  
g.drawLine(140,50,160,100);  
  
g.drawRect(20,100,140,100);  
g.fillRect(100,140,40,60);  
  
g.drawString("Home",20,30);  
g.drawLine(10,35,70,35);
```

Draw the output in the grid provided.

