KULLEĠĠ SAN BENEDITTU
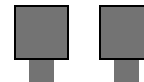# Boys' Secondary, Kirkop

Mark

HALF-YEARLY EXAMINATION – 2011/2012

Track 2 (AS)

FORM 4	COMPUTING	TIME: 1h 30min

Question	1	2	3	4	5	6	7	8	Global Mark
Max. Mark	10	6	13	8	13	22	14	14	**100**
Mark									

Instructions to students:
*Answer **ALL** questions.*
*Calculators are **NOT** allowed; Good English and orderly presentation are important.*
Read carefully each question

DO NOT WRITE ABOVE THIS LINE

Name: _____   Class: _____

1. **This question covers various topics covered in Computing. Fill in each of the below statements using a suitable word from the following list.** [10 marks]

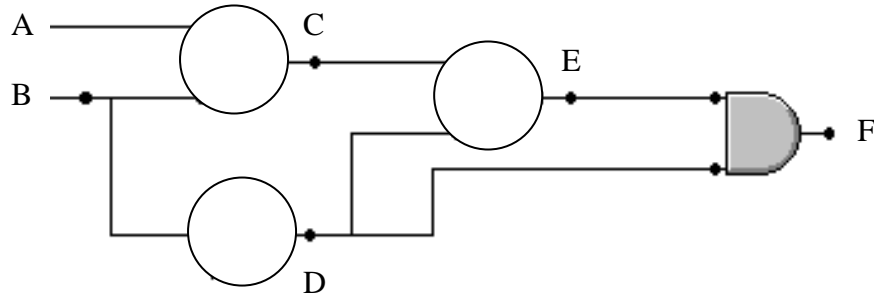|				
Digital	*Email*	*Analogue*	*Magnetic Tape*	*Plotter*
CD	*Touch screen*	*Archiving*	*Flowchart*	*Mainframe*
Bit	*Hexadecimal*	*Source Code*	*Table*	*Raster*
Hard Copy		*Main Storage*		*Graphics Tablet*
Microsoft PowerPoint			*Internet Service Provider*	

		Answer
a.	A hardware which is considered both an input and an output device.	
b.	A method of sending electronic letters via the World Wide Web.	
c.	The number system used in computing, made up of letters and numbers.	

d.	This is the 2nd fastest computer and is used by various companies.	
e.	An algorithm done during the design stage, before the actual programming starts.	
f.	A storage device with sequential file access.	
g.	Software used for doing presentations in front of an audience.	
h.	The printed version of a soft copy.	
i.	The code written by the programmer.	
j.	The process of moving unused old files from the hard disk to a secondary storage device instead of deleting them.	
k.	Smallest unit of storage also called Binary Digit.	
l.	A set of related records considering one particular subject.	
m.	A storage device storing up to 700 MB.	
n.	A company offering Internet Connectivity.	
o.	An output device used by architects to produce large printouts.	
p.	The term used to refer to RAM and ROM.	
q.	This data is continuous and has different values.	
r.	An image made up of pixels.	
s.	An input device used by designers to draw freehand sketches.	
t.	This data is fixed and has only two values 0 and 1.	

2. This question is on Computer Logic. [6 marks]

The figure below shows a logic circuit with some gates not named and its incomplete truth table on next page.

a. Using the information given on the truth table below, identify and write down below the names of the three missing logic gates. [3]

Logic Gate C	Logic Gate D	Logic Gate E

b. Complete the truth table to show the output **F**. [1]

A	B	C	D	E	F
0	0	0	1	1	
0	1	0	0	0	
1	0	0	1	1	
1	1	1	0	1	

c. What is a **Truth Table**? [2]

_____

_____

3. **This question is on Databases.** [13 marks]

a. What is the difference between a **Database** and a **DBMS**? [2]

_____

_____

_____

b. The following table has been created to keep students' records. Write down an appropriate data type for each field. [2]

Field name	Data type
i. Name	
ii. Date of Birth	
iii. Age	
iv. Male?	

c. Write down a field which can be set as a **primary key** for the above *Students* table. [1]

_____

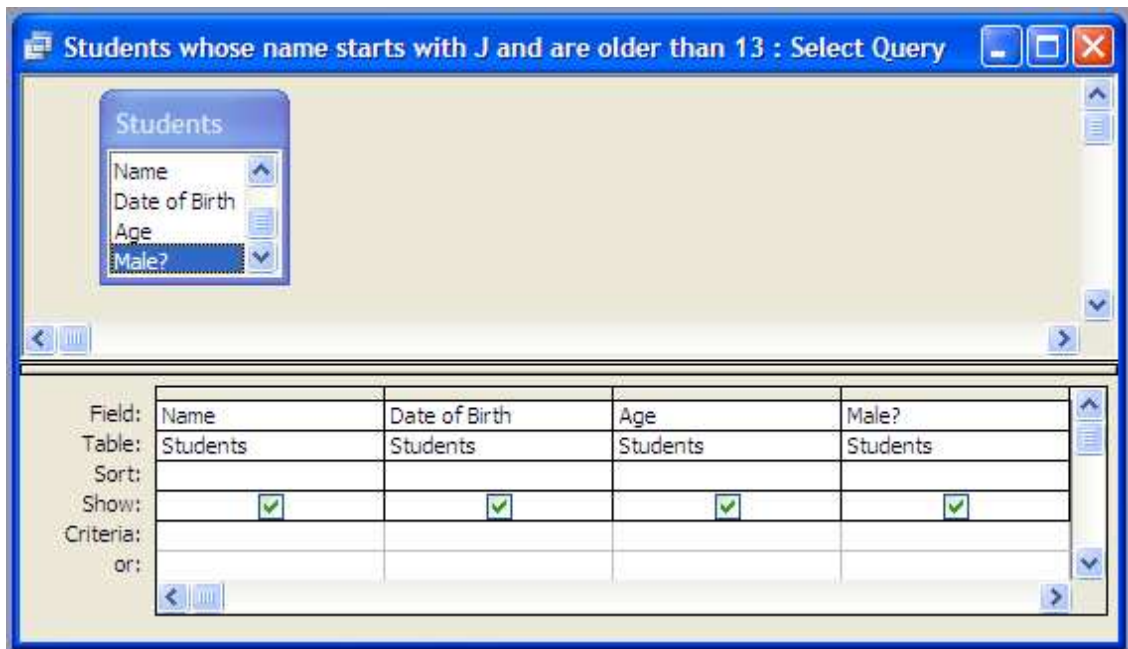d. What is a **relationship**? Mention **two** types of relationships. [2]

Definition:

_____

_____

Two types of relationships:

_____

e. The user of this database wants to create a query to output a list of all students whose **name starts with the letter J** and who are **older than 13 years**.

The screenshot on opposite page shows the query in Design View. It is noted that the user did not fill up the criteria. Can you help him fill in the criteria section based on the query specified above? [2]

f. Student records need to be **edited**, **deleted** and **inserted**. Give an example of why each of these would be needed. [3]
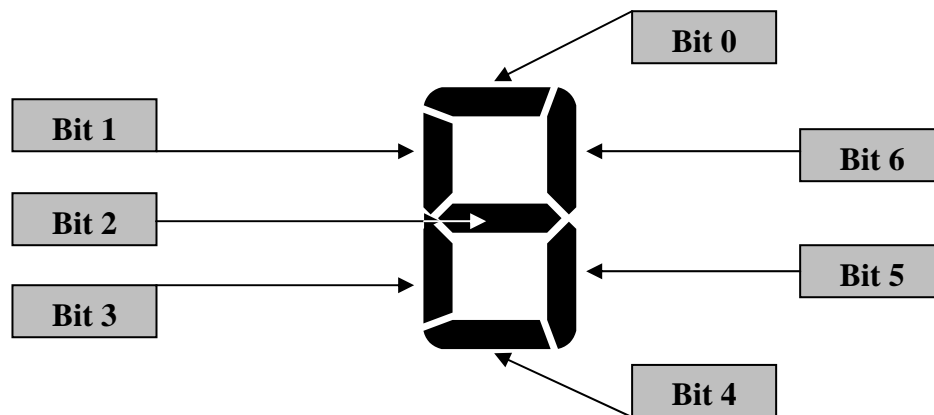
Edited: _____

_____

Deleted: _____

_____

Inserted: _____

_____

g. What is a **Report**? [1]

_____

_____

4. This question is on Number Conversions. [8 Marks]

An LCD display is made up of seven segments as shown below. To display the digits, the correct segments have to be switched on.

A byte of data is sent to the LCD such that each bit controls one segment with the exception of bit 7. If a bit is 1, the segment is switched on. If a bit is 0, the segment is switched off. Assume bit 7 is always 0.

To display digit 8 shown above, the following byte of data 01111111 is sent to the LCD.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	1	1	1	1	1	1	1

a. Convert the numbers in the table on next page into binary **according to their base** and state which digits are displayed on the LCD. The first one is worked for you. [6]

Number	Base	Binary	Display
127_{10}	**Decimal**	01111111	8
75_{16}	**Hexadecimal**		
96_{10}	**Decimal**		

Space for working:

b. Is the number **9H7₁₆** a valid Hexadecimal number? Why?   [2]

_____

_____

_____

5. **This question is on Registers.**   **[13 marks]**

a. What is the **LARGEST** positive number that can be stored in a 6 bit register?

Give your answer in both **binary** and **decimal** formats.   [2]

_____

In binary   *In Decimal*

b. What is the **RANGE** of **binary numbers** which could be stored in a 6 bit register? [2]

From _____ to _____.

c. Convert the following binary number to **decimal**.   [1]

101101_2 _____

Space for working:

d. Write down whether the following statements are **True** or **False**. [4]

   i.   A numerical overflow is when a number does not fit in a register.   _____

   ii. Complementation is used when adding two binary numbers.   _____

   iii. Shifting a binary number once to the right will half the binary
        number.   _____

   iv. To multiply a binary number by four the binary number has to be
        shifted to the left four times.   _____

e. Work out the following binary additions.   [2]

    i.   1 0 0 1 1 +   ii.   1 0 1 1 1 +

           0 1 0 1 0   1 1 1 1 0

         _____   _____

f. The results for the above binary additions (question 5e) are to be stored in a **5 bit** register. Which of these two sums will cause an **overflow**?   [1]

An **overflow** occurs in sum _____.

g. What is the **minimum number of bits** required to store a character set made up of the English alphabet (26 letters) both in **capital and small letters**?   [1]

The **minimum number of bits** is _____.

6. **This question is on the CPU and the Fetch Execute Cycle.**   **[22 marks]**

a. Fill in the blanks with the following words.   [12]

Program Counter	Address Bus	Registers
Control Bus	System Clock	System Bus
Instruction Set	Data Bus	Memory Address Register
Main Memory	Memory Data Register	Instruction Register

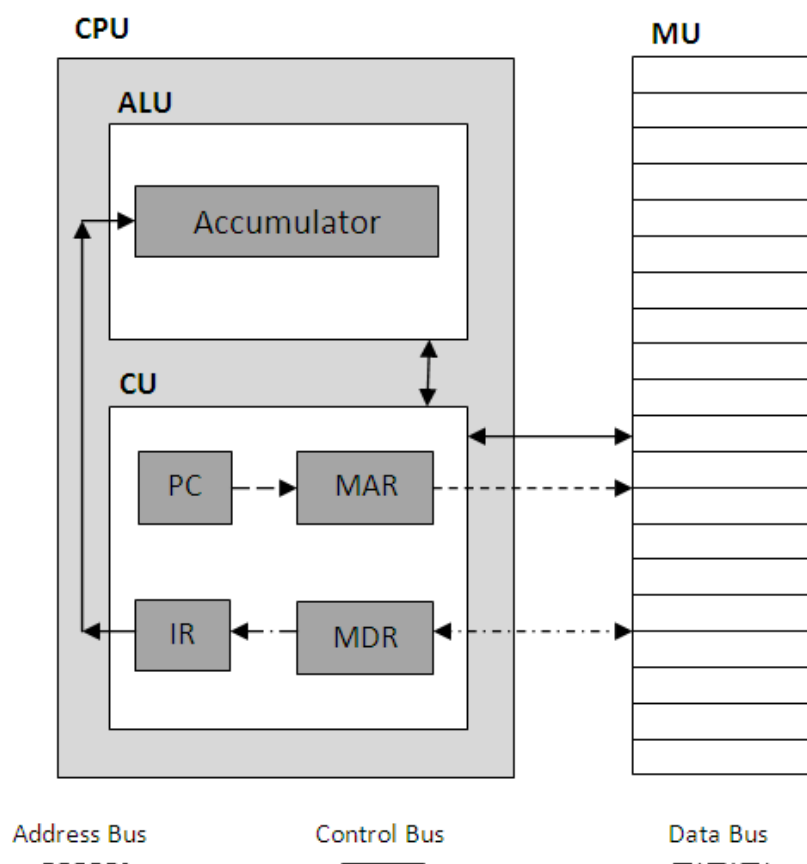 i. The speed at which the CPU can operate is determined by the _____.

  ii. The _____ is physically outside the CPU but it is still directly accessed by the CPU.

iii. _____ are small-sized, high-speed (as they are accessed more often than main memory), temporary storage locations inside the ALU.

iv. _____ holds the address of the next instruction to be executed.

v. _____ holds the instruction currently being executed.

vi. _____ holds the address of the memory location (usually taken from the PC) being accessed during a memory read (fetching data from memory) or write (putting data into memory) operation.

vii. _____ temporarily holds the data/instruction sent over the data bus during a read/write operation.

viii. The _____ is a pathway made of wires or lines, which connect together the processor, memory and I/O controllers.

ix. The _____ is used to identify particular locations in memory.

x. The _____ is used to move actual data and instructions between the processor, memory and peripheral devices.

xi. The _____ is used to transmit control signals as to control the operations and the data flow between the memory unit, ALU and other peripherals.

xii. An _____ is the complete collection of instructions a CPU is instructed to obey. It is a means of controlling the CPUs circuitry.

b. Fill in the missing words in the following sentence with your own words.   [2]

The Fetch and Execute cycle is the complete process of retrieving an instruction from store, _____ it and _____ it.

c. Look carefully at the diagram below and write down the steps of the **Fetch and Execute cycle**. [8]

CPU

MU

ALU

Accumulator

CU

PC → MAR

IR ← MDR

Address Bus
- - - - - -

Control Bus
‾‾‾‾‾‾

Data Bus
— · — · — ·

    i. The CU looks for _____.

   ii. The address is then moved _____.

  iii. The instruction is fetched from memory _____

  iv. Then it is moved to _____.

   v. At the same time, the Program Counter is _____

      _____.

  vi. The instruction stored in the Instruction Register is _____.

 vii. After being decoded, the instruction is then _____.

viii. It is finally stored _____.

  ix. The same cycle starts over again.

7. **This question is on System Analysis.** **[14 marks]**

   a. What is a **System Life cycle**? [2]

   _____

   _____

   _____

   b. Name **two** different methods which system analysts can use to collect information about the present system. [2]

   _____

   _____

   c. What is the difference between **Direct changeover** and **Parallel changeover**? [2]

   _____

   _____

   _____

   d. Give one reason why very small businesses prefer a direct changeover rather than a parallel changeover? [1]

   _____

   _____

   e. Put the following stages of the system development life cycle in order (1 – 7): [7]

Task	Order number
Design of new computerized system.	
Control and review	
Present system study and analysis	
Programming and documentation	
System maintenance	
Implementation and changeover methods.	
Project selection and feasibility study.	

8. This question is on JAVA programming. [14 marks]

Write only one line of Java code to do the following tasks:

a. Create a **class** with the name *Exam*.

_____

b. Write the **sentence** '*This is the Half Yearly Exam'* on the screen.

_____

c. Write a **comment** '*This is a blank line*'.

_____

d. Declare a **variable** of type **integer** with the name of *num1*.

_____

e. **Add** two variables *num1* and *num2* and **store** the answer in variable *total*.

_____

f. Declare a **constant** of type **double** with the name *PI* and **store** in it *3.142*.

_____

g. **Store** *n* in *m* and then **add** 1 to *n*.

_____

END OF EXAM