UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: FEP 1023
COURSE	: INTRODUCTION TO PROGRAMMING
SEMESTER/SESSION	: 3 - 2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **4** questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise up your hands and ask the invigilator.

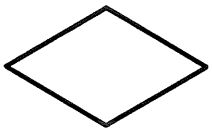
DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 8 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Identify the name of the following flowchart block:

i.  ..... (1 mark)

ii.  ..... (1 mark)

iii.  ..... (1 mark)

b) Determine **"correct"** or **"wrong"** for each of the following number declaration.

i. `signed char LED = 128;` ⟶ Correct / Wrong (1 mark)

ii. `int value = -1;` ⟶ Correct / Wrong (1 mark)

iii. `byte i = 65535;` ⟶ Correct / Wrong (1 mark)

c) State the name for each of the operators below:

i. `<=` (1 mark)

ii. `//` (1 mark)

d) Write a declaration program for the following parameter:

i. S1 at P3.3 (1 mark)

ii. Sev_seg at P1 (1 mark)

e) Figure 1 shows a water tank level indicator system.

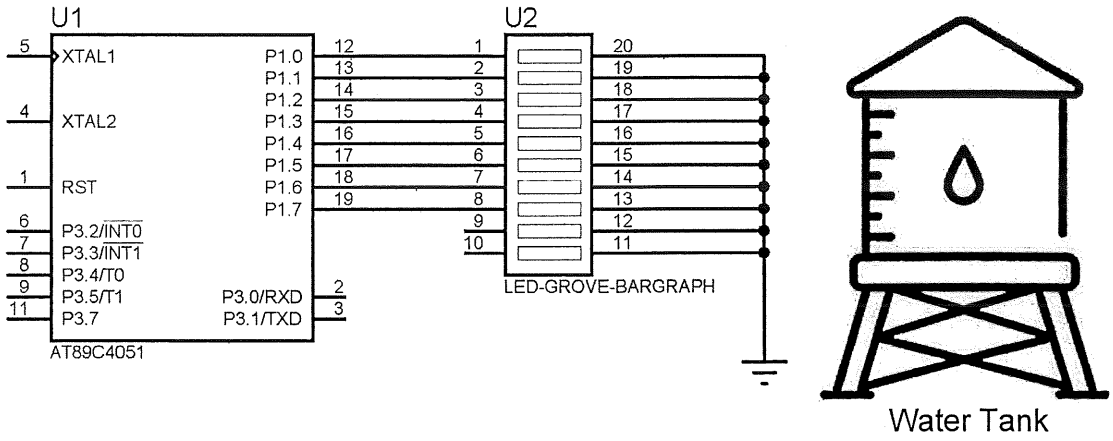


Figure 1

Based on Figure 1:

i. Illustrate the flow chart to turn ON LED bar-graph to indicate the level of water is *increasing* and *decreasing* continuously.

(5 marks)

ii. Produce a program to turn ON LED based on flow chart at question 1 e) i.

(10 marks)

QUESTION 2

a) The program code below has five syntax errors. Identify the errors by circling the error location in the program code.

```
#define led at P1_0_bit;
sbit SW1 at P3_2_bit;

void main()
{
  while(0)
  {
      whiel(SW1==1)
      {
        led=1;
        delay ms(1000);
        led=0;
        delay_ms(1000);
      }
  }
}
```

(5 marks)

b)

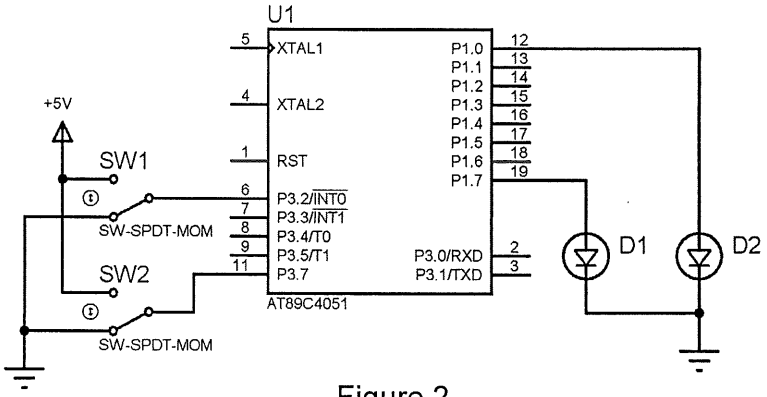


Figure 2

Based on schematic circuit in Figure 2:

i. Illustrate the flow chart to turn ON both LED simultaneously 3 times when either switch 1 OR switch 2 is pressed once.

(12 marks)

ii. Produce a program based on flow chart at question 2 b) i using `if` method to check the switch condition.

(8 marks)

QUESTION 3

a) Produce a `for` loop program to count 0 until 99. (5 marks)

b) Based schematic circuit in Figure 3, the system is used for counting process as follows:

- *Count up* from 0 to 3 when SW1 *pressed* (1) once.
- *Count Down* from 3 to 0 When SW2 *pressed* (1) once.
- When both switch *released* (0), turn ON only segment G.
- Store the data value for each number for 7-segment in **ARRAY**.

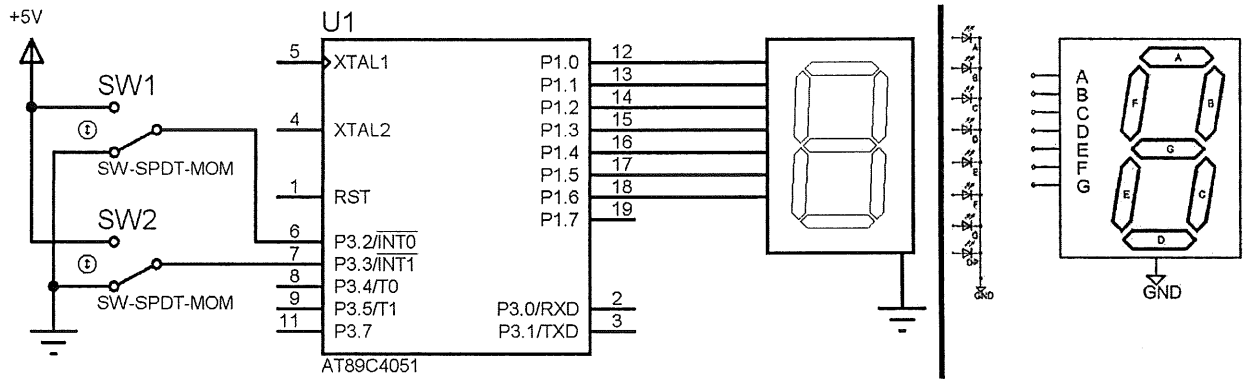


Figure 3

i. Illustrate the flow chart for the whole process. (8 marks)

ii. Produce the program for the task given. (12 marks)

QUESTION 4

a) Write a a *function declaration* (Prototype) for the following variable:

i. LED on (1 mark)

ii. LED off (1 mark)

iii. increasing (1 mark)

iv. decreasing (1 mark)

b) Based on schematic circuit in Figure 4, the LED bar-graph is displaying three LED blinking pattern in sequence as follows:

- Sequence 1 - Start with all LED OFF
- Sequence 2 – LED is ON from bottom to top one by one.
- Sequence 3 – LED is ON from top to bottom one by one.
- Sequence 4 – All LED blinking (ON/OFF) 3 times.
- Sequence repeats from sequence 1 again.
- Store a data for each sequence into different **function** (sub-program).

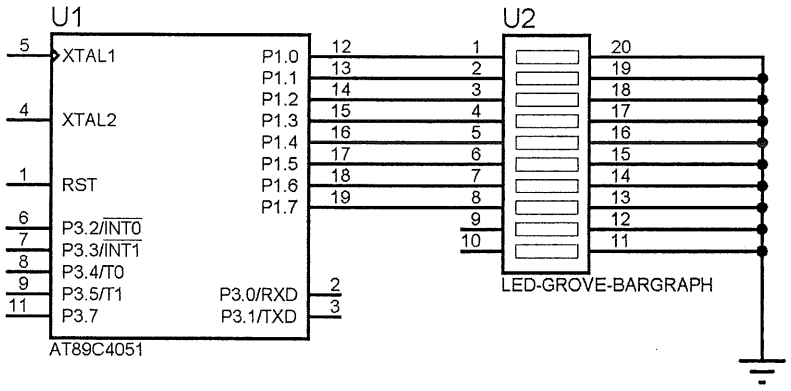


Figure 4

i. Illustrate the flow chart for the whole process. (7 marks)

ii. Produce the program for the task given. (14 marks)

----------**End of question**----------

ATTACHMENT 1 : CODE FORMATTING

Declaration

```
#define xxxx P2
sbit suis at P2_3_bit;
int x,y;
int nyala[]={0b00001111,
             0b11110000,
             0b10101010,
             0b01010101};
```

Prototype

```
void pattern_1();
```

Main Program

```
void main()
{
  while(1)
  {
    pattern_1();   ← Call function
  }
}
```

Selection

```
if(suis==1)
{

}
else
{

}
------------------------------
if(suis1==1)
{

}
if(suis2==1)
{

}
------------------------------
if(suis1==1)
{

}
else if(suis2==1)
{

}
else
{

}
```

Looping

```
while(suis==1)
{

}
------------------------------
do
{

}
while(suis==1)
------------------------------
for(int i=0; i>8; i++)
{

}
```

Function

```
void pattern_1()
{

}
```

Array

```
led=nyala[1];
led=nyala[3];
------------------------------

for(int i=0; i>4; i++)
{
  led=nyala[i];
}
```

ATTACHMENT 2 : INTEGRAL DATA TYPE

TYPE	RANGE
bool	0,1 (false, true)
sbit	0,1
char	-128 to 127 (*'a','b' etc.*)
unsigned char	0 to 255 (*'a','b' etc.*)
byte	0 to 255
int	-32,768 to 32,767
unsigned int	0 to 65,535
word	0 to 65,535
long	-2,147,483,648 to 2,147,483,647
unsigned long	0 to 4,294,967,295
float	-3.4028235E+38 to 3.4028235E+38
double	(currently same as *float*)