Experiment 4 – Procedure and Interrupt Usage

2020-2021 Spring

Preliminaries:

1. Students who will attend to this experiment are assumed to know:
   - Usage of registers on 8086
   - Usage of memory operations on 8086
   - Usage of variables on 8086
   - Usage of addressing modes on 8086
   - Usage of procedures within assembly on 8086
   - Usage of stack operations on 8086
   - Usage of emu8086
   - Usage of DOSBox
2. Study related topics from course slides and the textbook
3. Run example codes from slides and textbook
4. Study instruction set for 8086
5. Always comment your code!!

Work:

1. Write an assembly code that **uses subroutines for each shape** to print a square or a triangle on the screen if input is letter 'S/s' or 'T/t', respectively. The program should be case insensitive. For the other inputs, the program should write 'It is not a valid input' message on the screen and ask again. After shape type selection, program should take the height of the shape as from user as number of lines to print.

   Example 1: Select the desired shape: T/t

```
   X
  X X
 X   X
XXXXXXX
```

Example 2: Select the desired shape: S/s

```
XXXXX
X   X
X   X
XXXXX
```

2. Write an assembly code that **uses subroutines for each shape** to **draw** (using pixel operations) a square or a triangle on the screen if input is letter 'S/s' or 'T/t', respectively. Shapes should be drawn as centered on the screen horizontally and vertically in **graphics mode 12h** (i.e. 640x480 pixels). The program should be case insensitive. For the other inputs, the program should write 'It is not a valid input' message on the screen and ask again. After shape type selection, program should take the height of the shape from user as number of horizontal pixel lines.

3. Write an assembly code that uses the shapes from question 2 and detects a mouse click inside the shape. Program should quit when clicked inside the shape, otherwise it should continue to run. A mouse click means holding down the mouse button and releasing afterwards at that region. Detection should also be implemented by writing a procedure.

4. Write an assembly code that uses subroutines to track mouse movement and draw a simple box as mouse cursor. Program should draw a copy of the box at current mouse location when the left mouse button is pressed. Both detection and drawing should be implemented as separate procedures. This can be thought as a very primitive paint program.

   You will be responsible for all questions during experiment.

Notes :

- **You should prepare a preliminary work report with the answers of the questions on the "Work" part.**
- **All answers should be in English, it may be better to put your assembly codes in a Text box for better readability, code parts has to use a Type Writer font like `Courier New`.**
- **Each answer code file should be uploaded to the system seperately. You should also upload a proper report containing all answers and results together with your comments.**