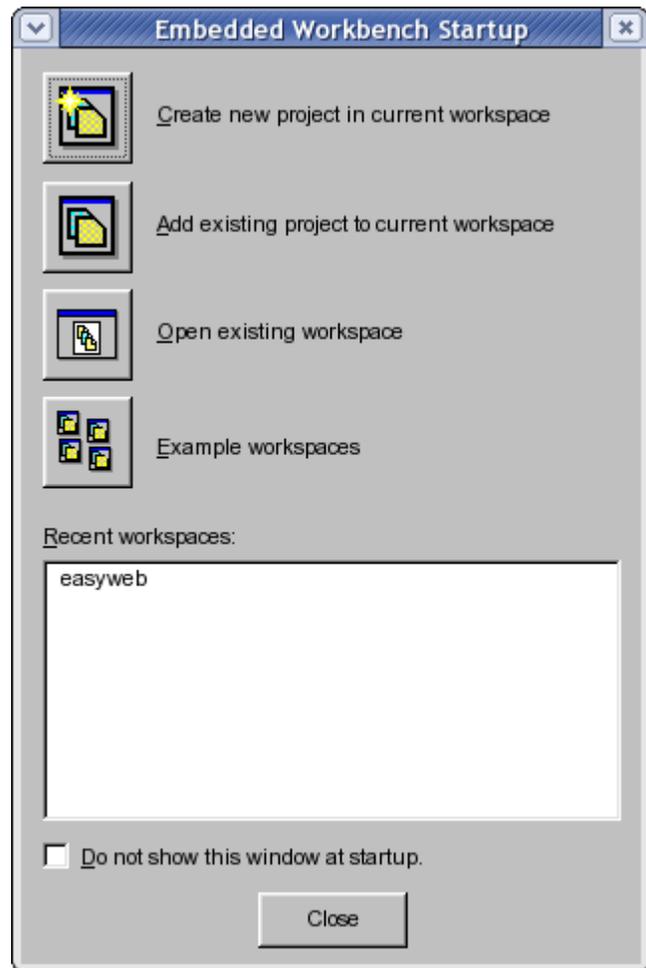
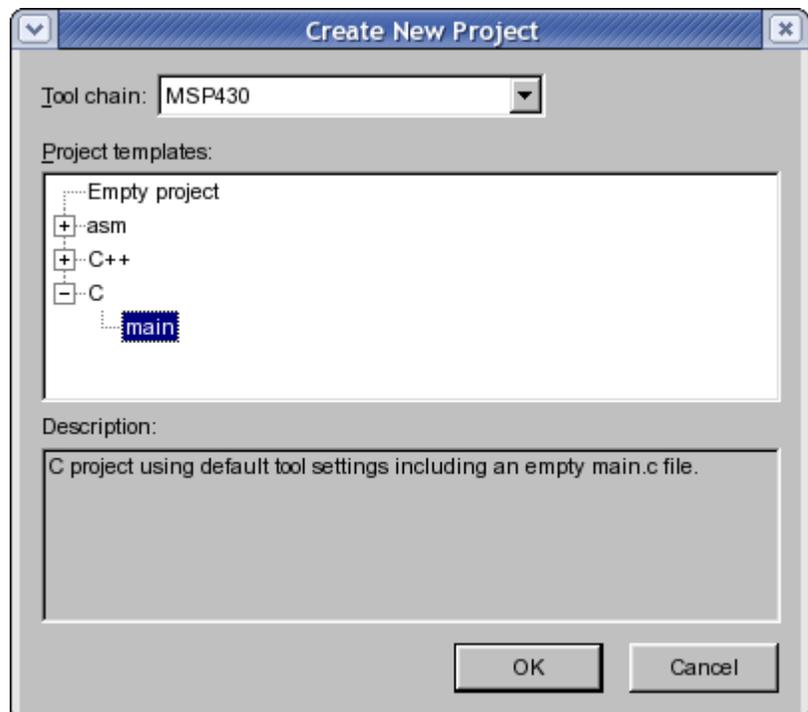


Using the MSP430 development environment

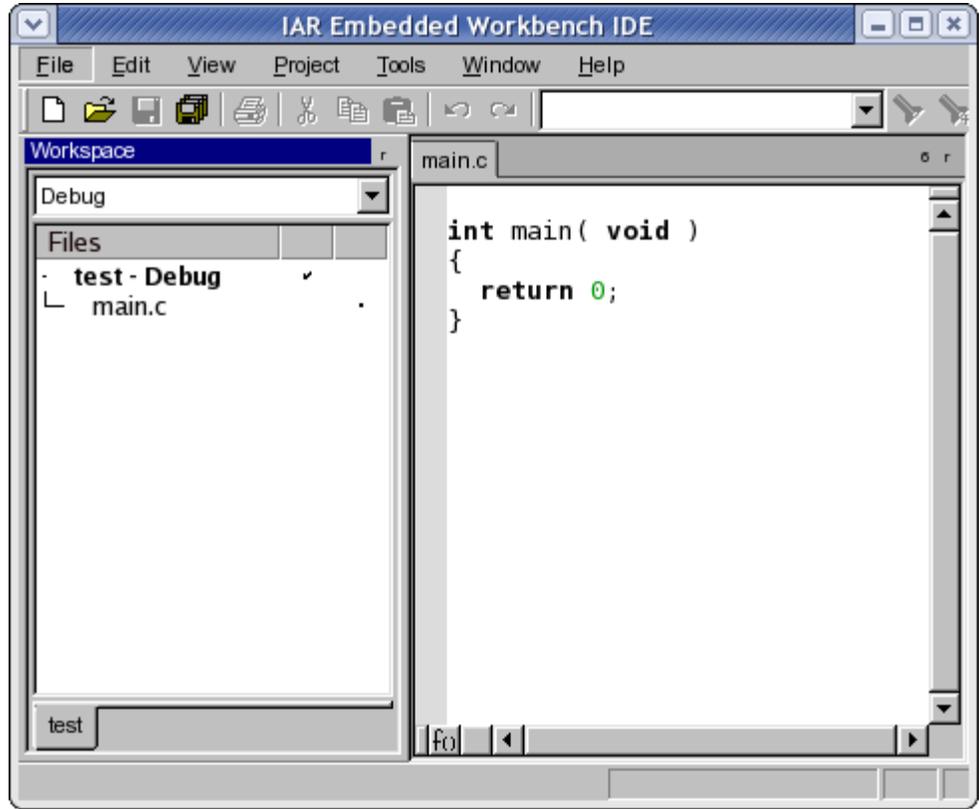
- 1) When you start the MSP430 development environment you will see a dialogue like this:
- 2) Choose “Create new project in current workspace”



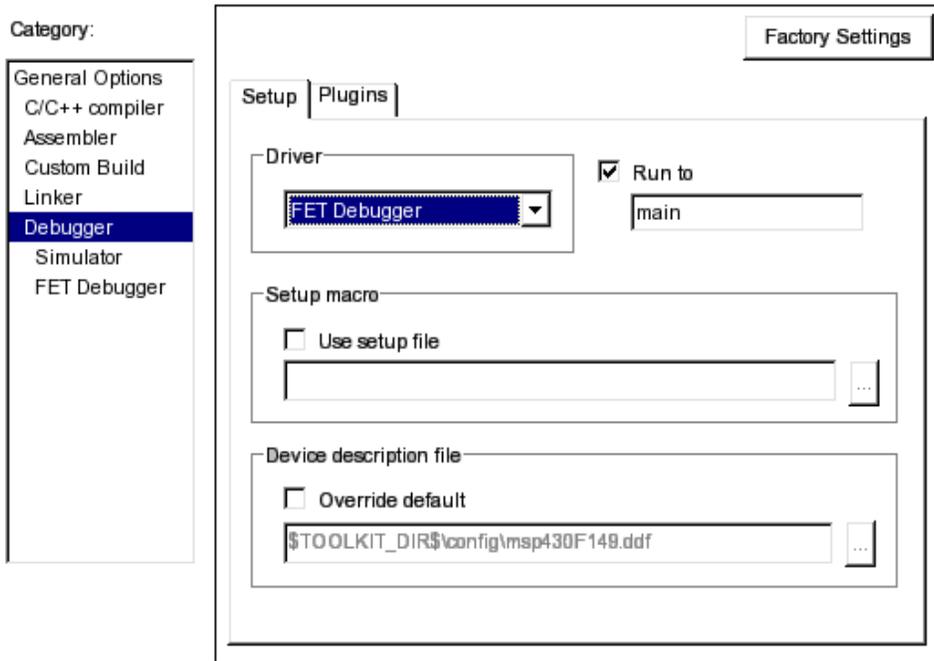
- 3) You are then asked to select a template project. The simplest is a simple “C” project with a ready made “main” skeleton function so choose this one.



4) You should now find yourself looking at a screen like this.



5) Highlight the project name (test – Debug in the picture above). Click the right mouse button to reveal a new menu. Select “Options” and change the debugging option as shown below (FET Debugger):



- 6) Change the file main.c as follows:
- 7) Compile the program
- 8) Press Debug to download the program to the board.
- 9) By either single stepping or running the program examine its operation.

```
// portcopy.c
// copies the contents of P4IN to P1OUT
// Buttons on TIMSP430 board should be able
// to change the relay outputs.

typedef unsigned char byte;
#define P1IN *((byte *)0x20)
#define P1OUT *((byte *)0x21)
#define P1DIR *((byte *)0x22)
#define P4IN *((byte *) 0x1c )
#define P4OUT *((byte *) 0x1d )
#define P4DIR *((byte *) 0x1e )
#define WDTCTL *((short *) 0x120)
#define WDTCTL 0x0080
#define WDTPW 0x5a00
void main( void )
{
    WDTCTL = WDTPW + WDTCTL; // Stop watchdog
                             // timer

    P1DIR = 0xf0;
    P1OUT = 0xf0;
    P4DIR = 0x00;
    while (1==1)
        P1OUT = P4IN;
}
```

Questions you should answer in your report:

- a) What are the meaning of the various “#define” statements in the program.
- b) What does EACH line of the main function do?
- c) What is the function of a Port?
- d) What is the function of a Data direction register?
- e) How do the contents of P4IN (in hex and binary) change when each of the push buttons is pressed.
- f) How would you modify the program so that it turns on the upper relay output when the two leftmost buttons are pressed?

