Student Name:

ROBT 305 – Embedded Systems Quiz #3

Session 1

Collect 10 out of 11 points. Please provide precise answers.

1. a) Find the resolution of an 8-bit ADC in Volts if the input analog signal varies in the range 0 … 5.12 V **(1 point)**

5.12 V/(2^8) ADC levels = 5.12 V/256 = 0.02 V

b) Find the digital equivalent of the 3 V input signal **(1 point)**

3V/0.02V = 150_{10}

2. __B___ provide(s) an interface to the services provided by an operating system **(1 point).**

   A) Shared memory
   B) **System calls**
   C) Simulators
   D) Communication

3. When a program becomes a process? **(1 point)**

   A program is passive (the program code file)
   When it program loaded to memory for executing by CPU it becomes a process (active)

4. The program shown below uses system call **fork()** to create a copy process of itself, i.e. there will be a parent and a child processes. The program also uses the Pthreads API to create threads within processes. What would be the output from the program at LINE C and LINE P? **(1 point)**

```
#include <pthread.h>
#include <stdio.h>

#include <types.h>

int value = 0;
void *runner(void *param); /* the thread */

int main(int argc, char *argv[])
{
pid_t pid;
pthread_t tid;
pthread_attr_t attr;

   pid = fork();

   if (pid == 0) { /* child process */
      pthread_attr_init(&attr);
      pthread_create(&tid,&attr,runner,NULL);
      pthread_join(tid,NULL);
      printf("CHILD: value = %d",value); /* LINE C */
   }
   else if (pid > 0) { /* parent process */
      wait(NULL);
      printf("PARENT: value = %d",value); /* LINE P */
   }
}

void *runner(void *param) {
   value = 5;
   pthread_exit(0);
}
```

LINE C value = 5
LINE P value = 5

5. Using the program shown in Figure below, identify the values of PID at lines A, B, C, and D. (Assume that the actual PIDs of the parent and child are 1800 and 1805, respectively.) . Function **getpid()** returns the actual value of PID. **(1 point)**

```
#include <sys/types.h>
#include <stdio.h>
#include <unistd.h>

int main()
{
pid_t pid, pid1;

    /* fork a child process */
    pid = fork();

    if (pid < 0) { /* error occurred */
       fprintf(stderr, "Fork Failed");
       return 1;
    }
    else if (pid == 0) { /* child process */
       pid1 = getpid();
       printf("child: pid = %d",pid); /* A */
       printf("child: pid1 = %d",pid1); /* B */
    }
    else { /* parent process */
       pid1 = getpid();
       printf("parent: pid = %d",pid); /* C */
       printf("parent: pid1 = %d",pid1); /* D */
       wait(NULL);
    }

    return 0;
}
```

Line A - 0
Line B - 1805
Line C - 1805
Line D - 1800

6. A process control block _**A**__. **(1 point)**

   A) **includes information on the process's state**
   B) stores the address of the next instruction to be processed by a different process
   C) determines which process is to be executed next
   D) is an example of a process queue

7. A _**C**_ provides an API for creating and managing threads. **(1 point)**
   A) set of system calls
   B) multicore system
   C) thread library
   D) multithreading model

8. Typing in Linux command line "**cd**" causes what to happen? **(1 point)**

Change folder

9. The "**ls**" command does what? **(1 point)**

List of files in the directory folder

10. ...A..... is the command to create new directory **(1 point)**
    A) mkdir
    B) newdir
    C) dir
    D) Mk/dir