Name:
No:
Signature: **Computer Operating Systems --- Quiz 1 --- 11.03.2014**
                No questions allowed --- 50 mins. --- Page 1

Question 1: (You will NOT receive any points for answers which are not explained.**)**

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

int *ptr = (int *) malloc (sizeof(int));

int main (void){
    pid_t f;
    *ptr=10;
    printf("pid=%d Adress=%p Content=%d \n", getpid(), ptr, *ptr);
    f=fork();
    if (f==-1){
        printf("Error \n");
        exit(1);
    }
    else if (f==0){
        *ptr=*ptr+2;
        printf("pid=%d Adress=%p Content=%d \n", getpid(), ptr, *ptr);
        exit(0);
    }
    else {
        *ptr=*ptr+3;
        printf("pid=%d Adress=%p Content=%d \n", getpid(), ptr, *ptr);
        exit(0);
    }
    return(0);
}
```

Give an example output that will be printed when the above program is executed? Explain.
(Note: You can choose appropriate process id numbers for the processes and adress values for the pointers).

Question 2: (You will NOT receive any points for answers which are not explained.)

```c
#include <pthread.h>
#include <unistd.h>
#include <stdio.h>
#include <stdlib.h>

int *ptr = (int *) malloc (sizeof(int));

void *my_function(void *t) {
  long tid;

  *ptr=*ptr+1;
  tid= (long) t;
  printf("pid=%d thr no=%ld Adress=%p Content=%d \n", getpid(), tid, ptr, *ptr);
  pthread_exit(NULL);
}

int main(void) {
  pthread_t threads[2];
  int rc, i;

  *ptr=0;
  for(i=0; i<2;i++) {
    rc = pthread_create(&threads[i], NULL, my_function, (void *)i);
    if (rc) {
      printf("thread creation error ...\n");
      exit(-1);
    }
  }
  printf("pid=%d --- %d threads created.\n", getpid(), i);
  pthread_exit(NULL);
  return 0;
}
```

Give an example output that will be printed when the above program is executed? Explain.
(Note: You can choose appropriate process id numbers for the processes and adress values for the pointers).

Question 3: (You will NOT receive any points for answers which are not explained.)

```c
#include <stdio.h>
#include <unistd.h>
#include <stdlib.h>
#include <sys/types.h>
#define COUNT 3

int main (void) {
    int i;
    for (i=0; i<COUNT; i++) {
        if (fork() == -1) {
            printf("Hata \n");
            exit(1);
        }
    }
    printf("My process id: %d \n", getpid());
    return (0);
}
```

(a) Give an example output that will be printed when the above program is executed? Explain.
(Note: You can choose appropriate process id numbers for the processes).
(b) Modify the above given code in such a way that only 3 child processes are created, i.e. there will be a total of 4 processes including the initial parent process. Explain your modification.