

BRAC University (Department of Computer Science and Engineering)
CSE 321 (Operating Systems) for Spring 2025 Semester
Quiz 1 (Set A)

Student ID:

Section:

Name:

Full Marks: 20

Duration: 30 minutes

1. Adhara, a CSE student, started reading a book on OS and learned about a multithreading model which allows only one thread to access the kernel at a time.

Identify the multithreading model that Adhara learned of. Write down one disadvantage of the model used and briefly explain the model that overcomes that disadvantage.

2. Describe how the concept of process states facilitates multitasking in an operating system.

3. **Find** the output of the following code snippet.

```
const int len=3;
static int r1=0;
static int r2=0;
int main(){
    pid_t f;
    int a[]={12,7,6};
    int b=len-1;
    f=fork();
    if(f<0){
        printf("fork failed\n");
    }
    else if(f==0){
        r1=r1+(a[0]+a[b]);
        r2=r2+(a[1]-a[b]);
    }
    else{
        wait();
        r1=r1+(a[0]/a[b]);
        r2=r2+(a[1]*a[b]);
    }
    printf("r1 = %d\n",r1);
    printf("r2 = %d\n",r2);
    if(f==0){
        printf("child is terminating\n");
    }
    else{
        printf("parent is terminating\n");
    }

    return 0;
}
```

4. Explain task parallelism with an example.

5. What is the purpose of dual mode operation? Which of the following instructions should be privileged (handled by kernel)?

- i. Access I/O device
- ii. Set value of timer
- iii. Read the date in the calendar.
- iv. Clear memory
- v. Switch from user to kernel mode
- vi. Turn off interrupts.

BRAC University (Department of Computer Science and Engineering)
CSE 321 (Operating Systems) for Spring 2025 Semester
Quiz 1 (Set B)

Student ID:

Section:

Name:

Full Marks: 20

Duration: 30 minutes

1. Adhara, a CSE student, started reading a book on OS and learned about a multithreading model which allows only one thread to access the kernel at a time.

Identify the multithreading model that Adhara learned of. Write down one disadvantage of the model used and briefly explain the model that overcomes that disadvantage.

2. Describe how the concept of process states facilitates multitasking in an operating system.

3. Find the output of the following code snippet. **Your output should exactly match with the original output.**

```
int main() {
    pid_t child_pid;
    int global_a = 68, b = 10;
    char message[] = "Hello, from the ";
    printf("Parent process started\n");
    child_pid = fork();
    if (child_pid == -1) {
        printf("Fork Failed\n");
    }
    else if (child_pid > 0) {
        wait(NULL);
        b *= 38;
        printf("Multiplication: %d * %d = %d\n", global_a, b, global_a);
        printf("Division: %d / %d = %d\n", b, global_a, b);
    }
    else {
        global_a += 98;
        printf("%sAddition: %d + %d = %d\n", message, global_a, b, global_a);
        printf("%sSubtraction: %d - %d = %d\n", message, b, global_a, b);
    }
    return 0;
}
```

4. Explain task parallelism with an example.

5. What is the purpose of dual mode operation? Which of the following instructions should be privileged (handled by kernel)?

i. Access I/O device ii. Set value of timer iii. Read the date in the calendar. iv. Clear memory v. Switch from user to kernel mode vi. Turn off interrupts.