

Quiz 3

Question 1



The lifetime for 5 processes, A-E, are as follows. Select the pair of processes that execute concurrently.
For example, A: [0, 10] means process A starts at time 0 and ends at time 10.

A: [15, 20], B: [1, 5], C: [7, 18], D: [9, 13], E: [16, 20]

Answers: A. A and E
B. B and D
C. C and E
D. B and C
E. E and D
F. A and C

Question 2



Given the multi-process program below, which of the following are feasible output(s) of the program? Assume that printf() will immediately display the letter on the screen.

```
int main()
```

```
{  
    printf("D");  
    if (fork() == 0){  
        printf("C");  
        if (fork() == 0){  
            printf("B");  
            exit(0);  
        }  
        printf("A");  
    }  
    printf("E");  
    exit(0);  
}
```

Answers: A. DEABCE
B. DBACE
C. DEABC
D. DCEBA
E. DCBAEE
F. DCDBA
G. DECAEB
H. DCBEAE

Question 3



Given the multi-process program below, what is/are the feasible output(s)? Assume that printf() will immediately display the number on the screen.

```
int main()
```

```
{  
    int a = 1;  
    if (fork() == 0){  
        if (fork() == 0){  
            a++;  
            printf("%d ", a);  
        }  
        a++;  
        printf("%d ", a);  
        exit(2);  
    }  
    a++;  
    printf("%d ", a);  
    exit(0);  
}
```

Answers: A. 2 2 3 4
B. 2 2 2 3
C. 2 3 1 3
D. 2 2 4 3
E. 2 2 3 2
F. 1 2 3 3

Question 4



Given the following program, which modification(s) can improve the locality of the program?

```
#define N 100
```

```
int summarize (int b[N][N][N])
```

```
{
```

```
    int i, j, k;
```

```
    int sum = 0;
```

```
    for (i = 0; i < N; i++)
```

```
        for (j = 0; j < N; j++)
```

```
            for (k = 0; k < N; k++)
```

```
                sum += b[k][j][i];
```

```
}
```

Answers: A. sum += b[i][k][j];
B. sum += b[j][i][k];
C. sum += b[i][j][k];
D. sum += b[k][i][j];

Question 5



The starting address of array 'int A[9][8]' is 0x100. The size of an 'int' data variable is 4 bytes. So the address of array element A[8][3] will be 0x(____). Assume that the array is stored row after row in the main memory. Please input the address in 3-digit hexadecimal format, e.g. 0x09F, and do not input '0x' again in the blank.

Question 6



Assume in a paging system, the current page table is shown below (page numbers in the page table are in decimal format). The page size is 2KB (B = byte). Given virtual address 0x347D, its corresponding physical address is 0x(____). Do not input '0x' again in the blank.

Virtual page number	Physical page number
3	7
6	8
7	3

Question 7



Assume the system has a cache that can hold 3 data blocks. The cache applies the FIFO replacement policy. Assume at the beginning, the cache is empty.

For a FIFO replacement policy, if currently the cache is full and a new block that is not in the cache is visited, an existing data block in the cache will be replaced. Of the 3 blocks in the cache, the data block that is **earliest** loaded into the cache will be replaced.

The following data blocks are accessed sequentially (A, B, C, D are data blocks):
D B A D C B D A B C

The number of cache hits is (____).