

# 國立彰化師範大學 100 學年度碩士班招生考試試題

系所：資訊工程學系

科目：資料結構及程式設計

☆☆請在答案紙上作答☆☆

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1. Choose the equivalent representations for `a[1][2]`  
(multiple-choice, more than one answer) (6%)  
(A) `*(a[1]+2)`      (B) `&a[1][2]`      (C) `*(*(a+1)+2)`      (D) `*a[1]+2`  
(E) `a[1]+2`      (F) `*&a[1][2]`      (G) `*(a+1)[2]`      (H) `a[1, 2]`
2. Choose the keywords which can be paired with “break”.  
(multiple-choice, more than one answer) (6%)  
(A) if    (B) switch    (C) do    (D) continue    (E) return
3. Is the following program correct? if not, why? (6%)

```
float f = 0.0f;
switch (f) {
    case 0.0:
        printf("f is zero"); break;
    case 1.0:
        printf("f is one");
}
```
4. Write the output of the following program. (8%)

```
#include <stdio.h>
void func(int n)
{
    int i;
    if (n == 1)
        printf("%d", n);
    else {
        func(n-1);
        for (i=0; i<n; i++)
            printf("%d", n);
    }
    printf("\n");
}

int main(void)
{
    int i;
    func(6);
    return 0;
}
```
5. Write the output of the following program. (8%)

```
int i, j=0;
for (i=0; i<8; i++) {
    if (i%2)
        continue;
    if (i==8) {
        printf("%d\n", j);
        break;
    }
    printf("%d\n", j+=i);
}
```
6. Write the output of the following program. (8%)

```
int a[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11};
```

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共 2 頁，第 2 頁

```
int b[3] = {2, 4, 6};
FILE * fp;

fp = fopen("test.bin", "wb");
fwrite(a+3, sizeof(int), 8, fp);
fclose(fp);

fp = fopen("test.bin", "rb");
fread(b, sizeof(int), 2, fp);
fseek(fp, sizeof(int)*2, SEEK_CUR);
fread(b, sizeof(int), 3, fp);

printf("%d %d %d", b[0], b[1], b[2]);
```

7. Complete the “int\_to\_string” function which can convert a positive integer to a string.

An example call of int\_to\_string() is as follows:

(8%)

```
#include <stdio.h>
void int_to_string(int x, char *pc);
int main(void)
{
    char str[20];
    int i = 12345;
    int_to_string(i, str);
    puts(str);

    return 0;
}
```

output
12345

8. How many different binary trees are there with n nodes? Why?

(20%)

9. What is the time complexity of T(n) defined below?

(10%)

If  $n=2$  then  $T(n)=1$  else

If  $n>2$  then  $T(n)= T(n/2)+\log n$

10. Read the following data in the given order, and show the corresponding trees.

(20%)

18, 11, 16, 22, 6, 17, 25, 37, 5, 31, 2, 28, 33

(1) Binary search tree

(2) AVL tree

(3) 2-3 tree

(4) Min-Max Heap