

國立彰化師範大學108學年度碩士班招生考試試題

系所： 數學系(選考丁)

科目： 資料結構

☆☆請在答案紙上作答☆☆

共3頁，第1頁

一、請寫出下列程式執行結果(共5題，每題10%)

1.

```
#include <stdio.h>
int main(){
    int arr[] = {5, 6, 3, 2, 1, 4}, n, gap, i, j, temp, k;
    n = sizeof(arr)/sizeof(arr[0]);
    for (gap = n/2; gap > 0; gap /= 2){
        for (i = gap; i < n; i += 1){
            temp = arr[i];
            for (j = i; j >= gap && arr[j - gap] > temp; j -= gap)
                arr[j] = arr[j - gap];
            arr[j] = temp;
        }
        for (k = 0; k < n; k++)
            printf("%3d", arr[k]);
        printf("\n");
    }
    return 0;
}
```

2.

```
#include <stdio.h>
int main(void){
    long num1 = 0;
    long num2 = 0;
    long *pnum = NULL;
    pnum = &num1;
    *pnum = 2;
    ++num2;
    num2 += *pnum;
    pnum = &num2;
    ++*pnum;
    printf("%d %d %d %d\n", num1, num2, *pnum, *pnum + num2);
    return 0;
}
```

3.

```
#include <stdio.h>
int main(){
    int rows = 5, i, j, number= 1;
    for(i=1; i <= rows; i++){
        for(j=1; j <= i; ++j){
            printf("%3d", number);
            ++number;
        }
        printf("\n");
    }
    return 0;
}
```

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共 3 頁，第 2 頁

4.

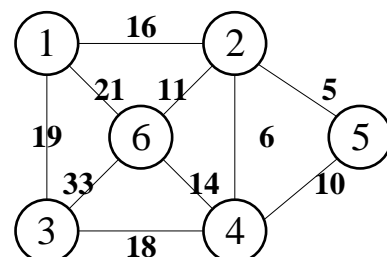
```
#include <stdio.h>
int count(int num){
    static int sum = 0;
    if(num > 0){
        sum += (num % 10);
        count(num / 10);
    } else {
        return sum;
    }
}
int main(){
    int n = 12345;
    printf("%d\n", count(n));
    return 0;
}
```

5.

```
#include<stdio.h>
int main(){
    int n = 19, i;
    while (n != 1){
        if (n % 2==0)
            n = n / 2;
        else
            n = 3* n + 1;
        printf("%5d", n);
    }
    printf("\n");
}
```

二、 Given six integers: 33, 11, 15, 43, 64, 8. Assume that we read these integers from left to right one by one to build a binary search tree, please draw its binary search tree. (10%)

三、 Find the minimum-cost spanning tree of the following graph by using Sollin's algorithm. (Note: You have to draw the immediate steps or briefly explain your reason. Answers without explanation get only 5 points). (10%)



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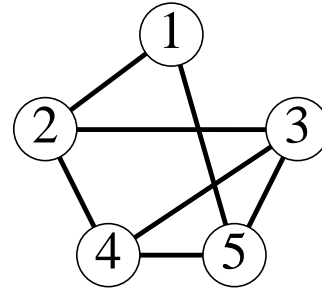
科目： 資料結構

☆☆請在答案紙上作答☆☆

共 3 頁，第 3 頁

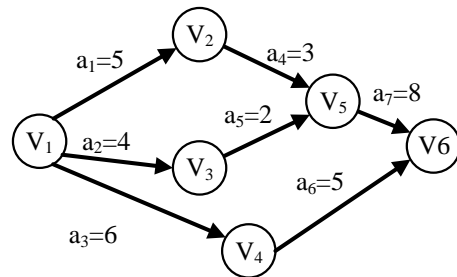
四、 Given the following graph, please write its **array representation** when we use a one-dimension array to implement this graph. (10%)

ANS:



五、 For the **AOE network** of the following graph (10%)

- What is the earliest time the project can finish?
- Which activities are critical?



六、 Please show the detail steps of **recursive merge sort** to sort the list (38, 27, 43, 3, 9, 82, 10). (10%)