警 示

《中山大学授予学士学位工作细则》第六条

考 试 作 弊 不 授 予 学 士 学 位

计算机科学系　　2009 上学期

# 《程序设计 I》期末考试试题(A)

任课教师：　肖菁、吴维刚　　考试形式：闭卷　　考试时间：2 小时

年级：09　专业：　计科、网工、信安　　姓名：_____ 学号：_____成绩_____

## 1. Single Answer Questions (Only one choice is correct). 20points.

Choose the alternative(s) that best completes the statement or answers the question.

1) _____ translates high-level language program into machine language program.
A) CPU B) A compiler C) An assembler D) The operating system

2) _____ is an object-oriented programming language.
A) Pascal B) Java C) Ada D) C

3) Which of the following is a valid user-defined identifier?
A) _343 B) 9X C) 8+9 D) class

4) To improve readability and maintainability, you should declare _____ instead of using literal values such as 3.14159.
A) classes B) constants C) variables D) functions

5) What is the value of (double)(5/2)?
A) 2.5; B) 2.0; C) 2; D) 3; E) 3.0;

6) Suppose x is a char variable with a value 'b'. What is the printout of the statement cout << ++x?
A) b B) d C) a D) c

7) Suppose x = 1, y = -1, and z = 1. What is the printout of the following statement?

```
if (x > 0)
if (y > 0)
cout<<"x > 0 and y > 0";
else if (z > 0)
cout<<"x < 0 and z > 0";
```

A) x > 0 and y > 0; B) x < 0 and z > 0; C) no printout. D) x < 0 and z < 0;

8) You can always convert a “switch” statement to an equivalent “if” statement.

A) true B) false

9) Which of the following is a valid/useful boolean expression.
A) (1 < x < 100) B) x C) (x =< 5) & (x>=5) D) (x = 1) || (x != 1)

10) What is the value of "1.0 + 1.0 + 1.0 == 3.0"?
A) true B) false C) There is no guarantee that 1.0 + 1.0 + 1.0 == 3.0 is true.

11) What is the execution result of the following statements?

```
char *p =”abcdefgh”;
p+=3;
cout<<strlen(strcpy(p, “ABCD”));
```

A) 8 B) 12 C) 4 D) memory error

12) Which of the following is not an advantage of using functions.
A) Using functions hides detailed implementation from the clients.
B) Using functions makes reusing code easier.
C) Using functions makes programs easier to read.
D) Using functions makes program run faster.

13) Given: int i, int j=2; int *p=&i; which of the following statement can perform the same assignment as “ i=j;”?
A) i = *p;
B) *p = *&j;
C) i = &j;
D) i = **p;

14) Suppose you declare

```
int count = 5;
int *pCount = &count;
```

which of the following is true?
A) *pCount is 5
B) “count” contains the address of count
C) *count is the address of count
D) &count is 5

15) Suppose you declare the following:

```
double radius = 5;
const double const* pValue = &radius;
```

Which of the following statements is allowed?

A) pValue = &radius;
B) radius++;
C) (*pValue)++;
D) *pValue = 0;

16) Assume you declared int *p and p's current value is 1000. What is p + 1?
A) 1002 B) 1003 C) 1004 D) 1001

17) What is the return value for xFunction(4) after calling the following function?

```
int xFunction(int n) {
  if (n == 1)
      return 1;
  else
      return n + xFunction(n - 1);
}
```

A) 10 B) 9 C) 11 D) 12

18) Which of the following statements is NOT true?
A) A default no-arg constructor is provided automatically if no constructors are explicitly declared in the class.
B) Constructors are invoked when an object is created.
C) At least one constructor must always be defined explicitly.
D) Constructors do not have a return type, not even void.
E) Constructors must have the same name as the class itself.

19) We can use the private keyword to encapsulate data fields in a class. Which of the following statements is NOT true?
A) Encapsulating data fields makes the program easy to maintain.
B) Encapsulating data fields makes the program short.
C) If you don't use the public keyword, the visibility is private by default.
D) Encapsulating data fields helps prevent programming errors.

20) To open a file for binary input, use the mode _____.
A) ios::binary | ios::in
B) ios::ate | ios::binary
C) ios::app | ios::binary
D) ios::out | ios::binary

## 2. Mistakes identification. 20points.

The following C++ code will not compile/execute correctly. Please find out the mistakes (will cause compiling or running errors) and briefly explain what the mistakes are. You do not need to correct the mistakes.

## 1) A program that counts the vowels in a word.

```
1)  #include <iostream>
2)  #include <cstring>
3)  using namespace std;
4)  int countVowels(char *text){
5)      int novowels;
6)      for(int x =0; x<=strlen(text); x++)
7)          if(text[x]== 'a' || 'e' || 'i' || 'o' || 'u' )
8)              novowels++;
9)      return novowels;
10) }
11) int main(){
12)     char str[21];
13)     cout<<"\nEnter a word, no more than 20 letters\n";
14)     cin>>str; //Get the text string from keboard
15)     cout<<"The total number of vowels:"<<countVowels(str)<<endl;
16) }
```

## 2) A program that describes the class of pets.

```
1)  #include <iostream>
2)  #include <cstring>
3)  using namespace std;
4)  enum TYPE {CAT, DOG, TORTOISE, OTHER};
5)  class Pet{
6)  public:
7)      Pet(){
8)          strcpy(name, "unknown");
9)          age = 0;
10)         type = OTHER;
11)     }
12)     Pet(char *name, int age,TYPE type){
13)         strcpy(this->name, name);
14)         this->age=age;
15)         this->type=type;
```

```
16)             return 0;
17)         }
18)         void showSound(){
19)             switch (type){
20)                 case CAT:
21)                     cout<<"meow...\n";
22)                     break;
23)                 case DOG:
24)                     cout<<"bark...\n";
25)                     break;
26)                 default:
27)                     cout<<"...\n";
28)             }
29)         }
30)     private:
31)         char name[10];
32)         int age = 0;
33)         TYPE type;
34)     };
35)     int main(){
36)         Pet p1;
37)         Pet p2("Baby",1, CAT);
38)         p1.showSound();
39)         p2.showSound();
40)     }
```

## 3. Program output analysis. 20points.

Analyze and write down the output for the following programs.

### 1) A program that shows the case of calling functions

```
#include <iostream>
using namespace std;
int num =0;
void func1(){
    static int num_1=0;
    num_1++;
    num++;
```

```
    cout <<num_1<<"\t"<<num<<endl;
}
void func2(){
    static int num_2=0;
    num_2++;
    num++;
    cout <<num_2<<"\t"<<num<<endl;
}
int main(){
    int a[3]={1,2,3};
    for(int i=0; i<3; i++)
        if(a[i]%2)
            func1();
        else
            func2();
    return 0;
}
```

**2) A program that shows the case of recursion**

```
#include <iostream>
using namespace std;
int func(int number, int sn){
    int factor;
    if(number == 1) return 1;
    factor =2;
    while(number %factor!=0) factor++;
    if(sn ==0) cout<< endl<<number <<"=" <<factor;
    else cout<< "*" <<factor;

    func(number/factor, ++sn);
    return 1;
}
int main(){
    cout<<"The result is: ";
    func(15, 0);
    cout<<endl;
    return 1;
}
```

**3) A program that shows the use of object data field**

```
#include <iostream>
using namespace std;
```

```
#define MAXWIN 3
class Window{
public:
	Window(){
		cout<<"Constructing a window.\n";
	}
	void setVal(int theid, int thesize){
		id = theid;
		size = thesize;
	}
	void display(){
		cout<<"This is a window, with id: "<<id;
		cout<<", and size :"<<size<<endl;
	}
private:
	int id;
	int size;
};
class Program{
public:
	Program(int num){
		cout<<"Constructing a program.\n";
		winnum = num;
		for(int i=0; i<winnum;i++){
			win[i].setVal(i, i);
			win[i].display();
		}
	}
private:
	Window win[MAXWIN];
	int winnum;
};
int main(){
	Program prog(2);
}
```

## 4. Fill-in-the-blank Questions. 20points.

Please fill in the blanks in the follows programs to complete them.

**1) The following program is written to check if an integer with three digits (a, b, c) satisfies the equation: a*100+b*10+c = $a^3+b^3+c^3$.**

```
void main()
{
```

```
    int i,a,b,c,t;
    for(i=100;i<1000;i++)
    {
        t=i;
        a=t%10;
        t=_____;                                    //(1)
        b=t%10;
        c=_____;                                    //(2)
        if(i==a*a*a+b*b*b+c*c*c)
            cout<<i<<endl;
    }
}
```

**2) The following function checks whether a number is a circle number in decimal and in binary.**

For example, 313 is the circle number both in decimal and in binary (100111001).

```
int is_circle_num (int number, int base)
{
    int left_num, right_num;
    int max_power, left_power, right_power;
    max_power = 1;
    while (                    ) {                    //(3)
        max_power = max_power * base; }
    left_power = max_power;
    right_power = base;
    while (                    ) {                    //(4)
        right_num=(number/(right_power/base))%base;
        left_num=_____;                               //(5)
        if (right_num != left_num)      return 0;
        right_power=right_power*base;
        left_power=left_power/base;
    }
    return 1;
}
int main( ) {
    int n;
    cout<<"Please input an integer: "<<endl;
    cin>>n;
    if (is_circle_num(n,10)&&is_circle_num(n,2))
                        cout<<"true"<<endl;
    else cout<<"false"<<endl;
    return 0;    }
```

## 5. Programming design. 20points.

Please write a program to handle an Addressbook.

**What to do?**

1. Design a class Addressbook that encapsulates your friends' information, e.g. name, phone number, address;
   a) The class should provide functions to read information from keyboard and set the data fields accordingly;
   b) The class should also provide a function to print your friends' information in your addressbook into a file named "output.txt".
2. Write a main function to show how to create Addressbook objects and call the functions.
   a) Your friends' information is originally input from keyboard.

**Requirements and hints:**

1. Make sure that the data fields are marked as private to protect them from illegal access.
2. You are required to store 3 friends' information in your addressbook.