代號：30420
頁次：4－1

114年公務人員特種考試警察人員、一般警察人員、國家安全局國家安全情報人員、移民行政人員考試及114年特種考試退除役軍人轉任公務人員考試試題

考 試 別：一般警察人員考試
等　　別：三等考試
類科組別：警察資訊管理人員
科　　目：物件導向程式設計
考試時間：2 小時　　座號：_____

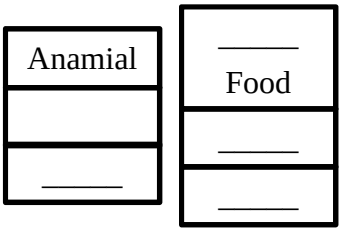
※注意：㈠禁止使用電子計算器。
㈡不必抄題，作答時請將試題題號及答案依照順序寫在試卷上，於本試題上作答者，不予計分。
㈢本科目除專門名詞或數理公式外，應使用本國文字作答。

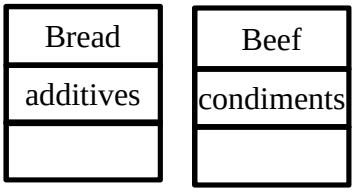
一、針對下列 C++程式碼，請說明其輸出與其程式 p.print()、q.split()(Line 28, 29)執行之運作流程邏輯；並請說明在 testPattern()中測試 Pattern 類別 split()(Line 27, 29)，對於「指令與條件判斷涵蓋度」不足之處。（25 分）

```
01  #include <iostream>
02  #include <string>
03  #include <vector>
04  using namespace std;
05  class Pattern {
06  public:
07      Pattern(string data) { this->data = data; }
08      void split(string symbol) {
09          int start = 0, stop = 0;
10          stop = data.find(symbol);
11          while (stop != string::npos) {
12              if (stop - start != 0) words.push_back(data.substr(start, stop - start));
13              start = stop + symbol.size();
14              stop = data.find(symbol, start);
15          }
16          if (start != length) words.push_back(data.substr(start));
17      }
18      void print() { for (auto& s : words) cout << s << "#";    cout<<endl; }
19  private:
20      string data;
21      vector <string> words;
22      int length;
23  };
24  void testPattern() {
25      Pattern p("this is a test");
26      Pattern q("that was so happle");
27      p.split(" ");
28      p.print();
29      q.split("ha");
30      q.print();
31  }
32  int main() {
33      testPattern();
34      return 0;
35  }
```

二、下列 Java 程式碼計算食物（Food）料理（cook）後，動物（Animal）攝取之卡路里量。請完成統一塑模語言 UML 圖；並說明其執行後的輸出，以及多型（Polymorphism）、封裝（Encapsulation）發生所在之程式碼行數。（25 分）

```
01  abstract class Food {
02      public Food(int cal, String type) {
03          this.calorie = cal;
04          this.type = type;
05      }
06      abstract public void cook(int c);
07      public String show(int c) {
08          String result = type+":";
09          cook(c);
10          result += calorie;
11          return result;
12      }
13      protected int calorie;                  // 卡路里
14      private String type;
15  }
16  class Bread extends Food {
17      public Bread(int c, int a) {
18          super(c, "Bread");
19          additives = a;
20      }
21      public void cook(int cal) { calorie += additives*cal;    }
22      private int additives;
23  }
24  class Beef extends Food {
25      public Beef(int c) {
26          super(c, "Beef");
27          condiments = c*2;
28      }
29      public void cook(int cal) { calorie += condiments%cal; }
30      private int condiments;
31  }
32  class Anamial {
33      public Anamial(Food f) {food = f;}
34      public String getCal() { return food.show(2);      }
35      private Food food;
36  }
37  public class FoodTest {
38      public static void main(String[] args) {
39          Food f1 = new Bread(3, 2);
40          Food f2 = new Bread(2, 3);
41          Food f3 = new Beef(3);
42          Anamial a1 = new Anamial(f1);
43          Anamial a2 = new Anamial(f2);
44          Anamial a3 = new Anamial(f3);
45          System.out.println(a1.getCal());
46          System.out.println(a2.getCal());
47          System.out.println(a3.getCal());
48      }
49  }
```





三、針對下列 C++程式碼，請修正程式碼行數 58「Job jobs ...」的錯誤及修正錯誤後正確執行之輸出；並請說明 Employee 類別 candidate 資料的運作原理，以及程式碼行數 61「e1.arrange()」程式執行之運作流程。（25 分）

```
01  #include <iostream>
02  #include <string>
03  #include <map>
04  using namespace std;
05  class Job {
06  public:
07      Job(string _name, int _sa, int _sk) {
08          name = _name;
09          salary = _sa;
10          skill = _sk;
11          employee_name = "None";
12      }
13      string getName() { return name; }
14      int getSalary() { return salary; }
15      int getSkill() { return skill; }
16      void hire(string    _name) { employee_name = _name; }
17      void print() { cout << name <<"::"<<employee_name<<endl; }
18  private:
19      string name;
20      int salary;
21      int skill;
22      string employee_name;
23  };
24  class Employee {
25  public:
26      Employee(string _name, int _sa, int _sk) {
27          name = _name;
28          salary = _sa;
29          skill = _sk;
30      }
31      void match(Job *m) {
32          if ((m->getSalary() >= salary) && (skill >= m->getSkill())) {
33              candidate[m->getName()] = m;
34          }
35      }
36      void arrange() {
37          int score = 0;
38          Job *jb, *jb_wanted;
39          for (auto c = candidate.begin(); c != candidate.end(); ++c) {
40              jb = c->second;                          // get value of MAP
41              if (jb->getSalary() >= score) {
42                  score = jb->getSalary();
43                  jb_wanted = jb;
44              }
45          }
46          jb_wanted->hire(name);
47      }
48      string getName() { return name; }
49  private:
50      string name;
51      int salary;
52      int skill;
53      map <string, Job *> candidate;
54  };
55  int main() {
56      Employee e1("Tom", 37, 85);
57      Employee e2("John", 35, 75);
58      Job jobs[] ={ new Job("RD", 45, 75), new Job("Sales", 35, 70),
59                    new Job("Manager", 55, 80)};
60      for (int i=0; i<3; i++) e1.match(jobs[i]);
```

```
61      e1.arrange();
62      for (int i=0; i<3; i++) e2.match(jobs[i]);
63      e2.arrange();
64      for (int i=0; i<3; i++) jobs[i]->print();
65      return 0;
66  }
```

四、針對下列 C++程式碼，請說明其輸出與其 inpuScore()、computeAverage()執行之運作流程邏輯；並請說明 computeAverage()設計上的問題。（25 分）

```
01  #include <stdexcept>
02  #include <iostream>
03  #include <string>
04  using namespace std;
05  class Student{
06  public:
07      Student(string n) { name = n; math_score = eng_score =average =0; }
08      void checkSmall(int s) {
09          if (s<0) throw out_of_range("small");
10          cout<<"ok,";
11      };
12      void inpuScore(int m_s, int e_s) {
13          try {
14              checkSmall(m_s); checkSmall(e_s);
15              math_score = m_s;
16              eng_score = e_s;
17          }
18          catch(exception &e) { cout<<e.what()<<endl; }
19      }
20      void computeAverage(int n) {
21          try {
22              if (n<=0) throw out_of_range("zero");
23              average = (math_score+eng_score)/n;
24          }
25          catch(exception &e) { cout<<"exc"<<endl; }
26          catch(out_of_range &e) { cout<<e.what()<<endl; }
27      }
28      void print() { cout << name <<":"<<average<<endl; }
29  private:
30      int math_score;   // 數學成績
31      int eng_score;    // 英文成績
32      int average;      // 平均成績
33      string name;
34  };
35  void test01() {
36      Student stu("John");
37      stu.inpuScore(0, 0);
38      stu.inpuScore(100, -1);
39      stu.inpuScore(100, 90);
40      stu.print();
41  }
42  void test02() {
43      Student stu("Tom");
44      stu.inpuScore(100, 90);
45      stu.computeAverage(0);
46      stu.print();
47  }
48  int main() {
49      test01();
50      test02();
51      return 0;
52  }
```