A+ Computer Science

AP REVIEW

2025 AP CS A EXAM

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Multiple Choice

-answer the easiest question 1st

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-bubble answers on answer sheet as you go

-answer every question

-keep track of your time - 90 minutes

Free Response

-Read all 4 questions before writing anything

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-most times question 1 is the easiest

-see if part B calls part A and so on

-many times part C consists of A and B calls

-write something on every question

-write legibly / use PENCIL!!!!!!!!!!

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Free Response

-When writing methods

  -use parameter types and names as provided

  -do not redefine the parameters listed

  -do not redefine the methods provided

  -return from all return methods

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Free Response

-When writing a class or methods for a class

  -know which methods you have

  -know which instance variables you have

  -check for public/private on methods/variables

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Free Response

-When extending a class

  -know which methods the parent contains

  -have the original class where you can see it

  -make sure you have super calls

  -check for public/private on methods/variables

  -make super calls in sub class methods as needed

Free Response Topics

Algorithms / Logic
– ifs, loops, methods

Make a Class
– create a class

Array/ArrayList
– get,set,remove,add,size - [],length

Matrices
– nested loops - array of arrays concepts

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Free Response Question 1

Algorithms / Logic

Algorithms / Logic

Algorithm problems often use array and strings, but like this year, they sometimes just use simple loops and method calls.

Algorithms / Logic

```
for(int aplus=1; aplus<7; aplus+=2)
{
  out.println("comp");
  out.println( aplus );
}
```

OUTPUT

```
comp
1
comp
3
comp
5
```

Algorithms / Logic

```
int run=25;
while(run>=10)
{
   out.println(run);
   out.println("loop");
   run=run-5;
}
```

OUTPUT

```
25
loop
20
loop
15
loop
10
loop
```

```
public int walkDogs(int hour)
{
  int num = company.numAvailableDogs(hour);
  if(num>maxDogs)
        num = maxDogs;
  company.updateDogs(hour, num);
  return num;
}
```

2025 Question 1 Part A

```
public int dogWalkShift(int startHour, int endHour)
{
  int tot = 0;
  for( int j = startHour; j <= endHour; j++)
  {
        int amt = walkDogs(j);
        tot = tot + amt * 5;
        if( amt == maxDogs || j >= 9 && j <= 17 )
            tot = tot + 3;
  }
  return tot;
}
```

2025 Question 1 Part B

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Free Response Question 2

Make a class

Make a Class

```
public Triangle(int a, int b, int c)
{
   sideA=a;
   sideB=b;
   sideC=c;
}
```

Constructors are similar to methods. Constructors set the properties of an object to an initial state.

Make a Class

```
public void setSideA(int a )
{
    sideA=a;
}
```

Modifier methods are methods that change the properties of an object.

Make a Class

```
public int getSideA()
{
  return sideA;
}
```

Accessor methods are methods that retrieve or grant access to the properties of an object, but do not make any changes.

Make a Class

```
public class Triangle
{
   private int sideA;
   private int sideB;
   private int sideC;
```

Instance variables store the state information for an object.

Make a Class

2025 Question 2

```
public class SignedText
{
  private String first, last;

  public SignedText( String a, String b )
  {
      first = a;
      last = b;
  }

  public String getSignature()
  {
      if(first.length()>0)
        return first.substring(0,1) + "-" + last;
      return last;
  }
```

```
public String addSignature( String t )
{
        String sig = getSignature();
        int loc = t.indexOf(sig);
        if(loc == -1)
                return t + sig;
        if(loc == 0)
                return t.substring(sig.length()) + sig;
        return t;
 }
}
```

Make a Class

2025 Question 2

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Free Response Question 3

ArrayList

ArrayList

A typical ArrayList question involves putting something into an ArrayList and removing something from an ArrayList.

ArrayList

Arraylist is a class that houses an array.
An ArrayList can store any type.
All ArrayLists store the first reference at spot / index position 0.

ArrayList

frequently used methods

Name	Use
add(item)	adds item to the end of the list
add(spot,item)	adds item at spot – shifts items up->
set(spot,item)	put item at spot z[spot]=item
get(spot)	returns the item at spot return z[spot]
size()	returns the # of items in the list
remove()	removes an item from the list
clear()	removes all items from the list

```
import  java.util.ArrayList;
```

ArrayList

```
List<String> ray;
ray = new ArrayList<String>();
ray.add("hello");
ray.add("whoot");
ray.add("contests");
out.println(ray.get(0).charAt(0));
out.println(ray.get(2).charAt(0));
```

OUTPUT

```
h
c
```

ray stores String references.

ArrayList

```
int spot=list.size()-1;
while(spot>=0)
{
   if(list.get(spot).equals("killIt"))
      list.remove(spot);

   spot--;

}
```

ArrayList

```
for(int spot=list.size()-1; i>=0; i--)
{
   if(list.get(spot).equals("killIt"))
      list.remove(spot);
}
```

ArrayList

```
int spot=0;
while(spot<list.size())
{
   if(list.get(spot).equals("killIt"))
      list.remove(spot);
   else
      spot++;
}
```

```
public Round(String[] names)
{
   competitorList = new ArrayList<Competitor>();
   for( int i = 0; i < names.length; i++ )
   {
        competitorList.add(
             new Competitor( names[i], i+1 ));
   }
}
```

2025 Question 3 Part A

```
public ArrayList<Match> buildMatches()
{
  ArrayList<Match> m = new ArrayList<Match>();

  int offSet = 0;
  if(competitorList.size()%2==1)
    offSet = 1;

  int sz = competitorList.size();
  for(int i = 0; i < sz/2; i++ )
  {
   Competitor a = competitorList.get(i+offSet);
   Competitor b = competitorList.get(sz-i-1);
   m.add(new Match(a,b) );
  }
  return m;
}
```

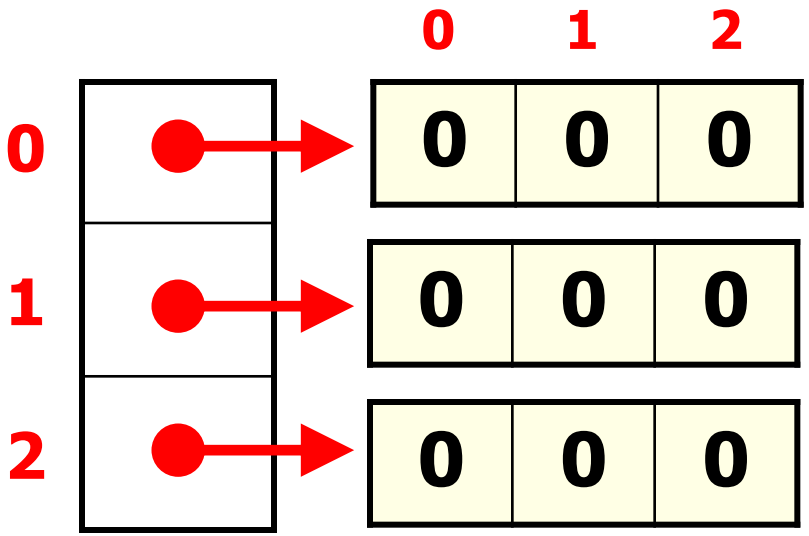
2025 Question 3 Part B

Free Response Question 4

Matrices

Matrices

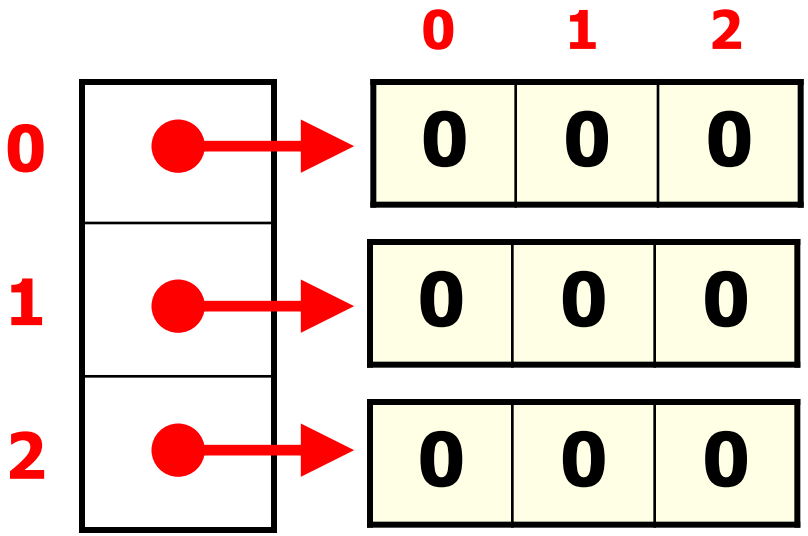
Typically, 1 question on the A test free response will require that students manipulate a 2-dimensional array.



Matrices

A matrix is an array of arrays.

```
int[][] mat = new int[3][3];
```



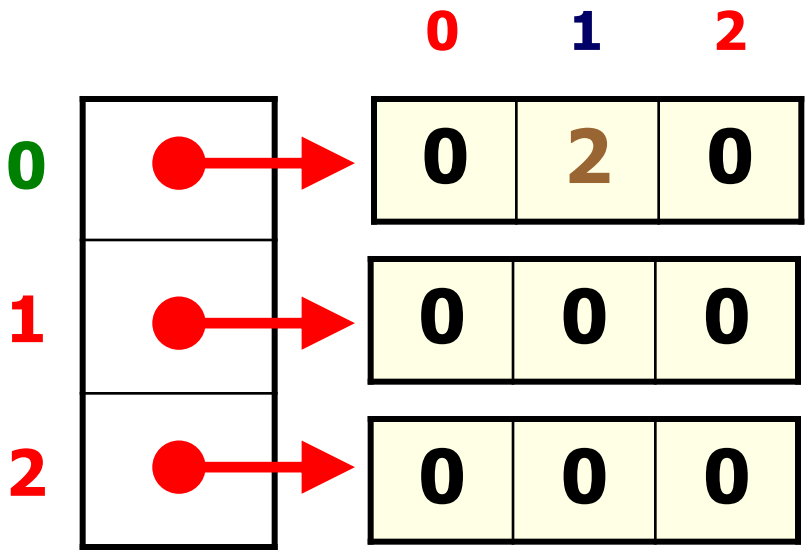
Matrices

A matrix is an array of arrays.

```
int[][] mat = new int[3][3];
mat[0][1]=2;
```

Which array?

Which spot?



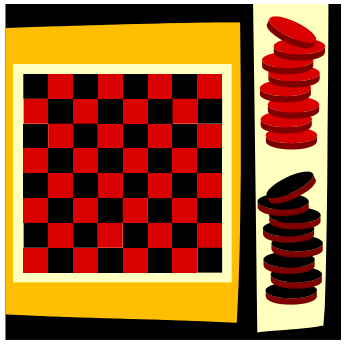
Matrices

	0	1	2	3	4
0	0	0	0	5	0
1	0	0	0	0	0
2	0	0	7	0	0
3	0	0	0	0	0
4	0	3	0	0	0

mat[2][2]=7;

mat[0][3]=5;

mat[4][1]=3



Matrices

```
for( int r = 0; r < mat.length; r++)
{
  for( int c = 0; c < mat[r].length; c++)
  {
       mat[r][c] = r*c;
  }
}
```

if mat was 3x3

0	0	0
0	1	2
0	2	4

Matrices

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```
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```

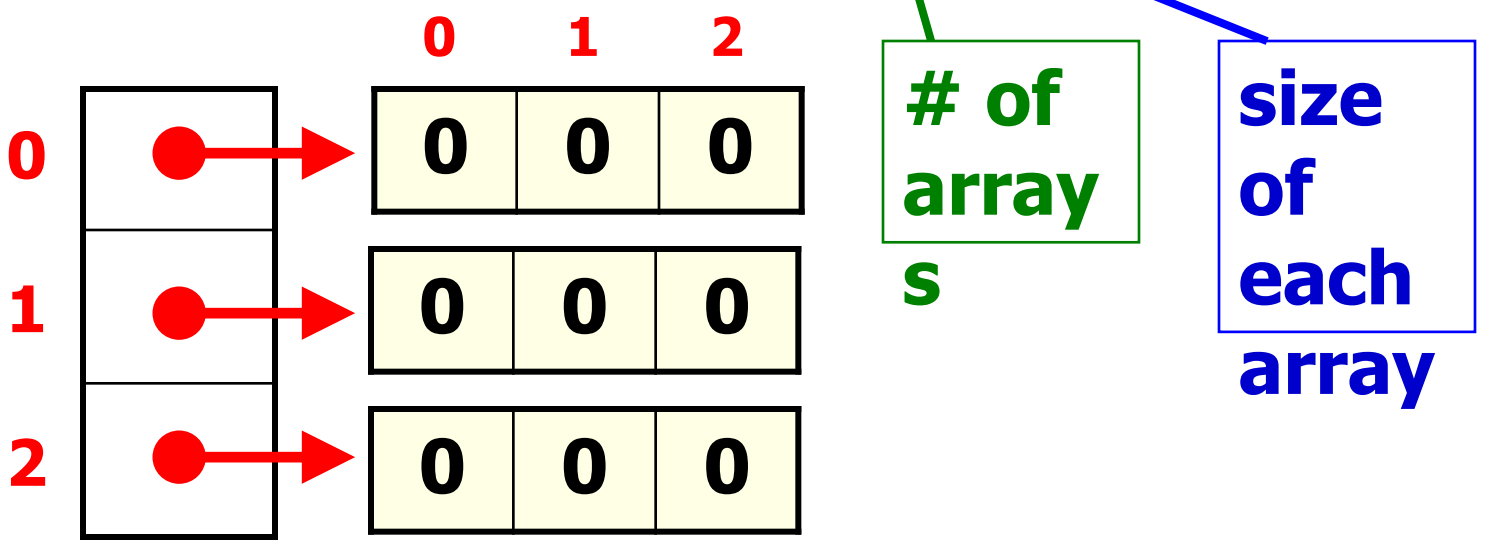

Matrices – for each

```
int[][] mat = {{5,7},{5,3,4,6},{0,8,9}};

for( int[] row : mat )
{
  for( int num : row )
  {
    System.out.print( num + " ");
  }
  System.out.println();
}
```

OUTPUT

```
5 7
5 3 4 6
0 8 9
```

Matrices – for loop

```
int[][] mat = {{5,7},{5,3,4,6},{0,8,9}};

for( int r = 0; r < mat.length; r++ )
{
  for( int c = 0; c < mat[r].length; c++ )
  {
    System.out.print( mat[r][c] + " ");
  }
  System.out.println();
}
```

OUTPUT

```
5 7
5 3 4 6
0 8 9
```

```
public SumOrSameGame(int numRows,
                                        int numCols)
{
  puzzle = new int[numRows][numCols];
  for( int i = 0; i < numRows; i++ )
  {
      for( int j = 0; j < numCols; j++)
      {
          puzzle[i][j] =
              (int)(Math.random()*9)+1;
      }
  }
}
```

2025
Question 4
part A

```
public boolean clearPair(int row, int col)
{
  int val = puzzle[row][col];
  for( int i = row; i < puzzle.length; i++ ) {
      for( int j = 0; j < puzzle[i].length; j++) {
          int curr = puzzle[i][j];
          if(!( i == row && j == col ))
              if( curr + val == 10 || curr == val ) {
                  puzzle[i][j] = 0;
                  puzzle[row][col] = 0;
                  return true;
          }
      }
  }
  return false;
}
```

2025 Question 4 part B

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