



AP[®] Computer Science A 2005 Scoring Guidelines

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AP[®] COMPUTER SCIENCE A
2005 SCORING GUIDELINES

2005 A Question 1: Hotel Reservation

Part A:	<code>requestRoom</code>	4 points
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- +1 loop over `rooms`
 - +1/2 attempt (must reference multiple elements of `rooms` in body)
 - +1/2 correct
- +1/2 test correct array entry for null (in context of loop)
- +1 1/2 handle new reservation (in context of a loop)
 - +1/2 attempt to create new reservation (some sense of `Reservation` construction)
 - +1/2 correctly create reservation (if add to `rooms`, must be in null location & assignment correct)
 - +1/2 return reservation (only if null entry)
- +1 handle wait list after loop or at appropriate time (only if full)
 - +1/2 add new guest to end of `waitlist` only once
 - +1/2 return null

Part B:	<code>cancelAndReassign</code>	5 points
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- +1 look up room number
 - +1/2 attempt (must call `res.getRoomNumber()` or use loop to find `res`)
 - +1/2 correct (must call `res.getRoomNumber()`)
- +1/2 test `waitlist` to see if empty
- +2 1/2 handle nonempty `waitList`
 - +1/2 get *first* entry from `waitList` (only if `waitlist` is not empty)
 - +1/2 create new `Reservation`
 - +1/2 assign `Reservation` to correct room } *can get these points by correctly calling requestRoom*
 - +1/2 remove only first entry from `waitlist` (only if `waitlist` is not empty)
 - +1/2 return new `Reservation` (only if `waitlist` is not empty)
- +1 handle empty case
 - +1/2 assign null to room (only if `waitList` is empty)
 - +1/2 return null (only if `waitList` is empty)

Note: If access using `get` on `rooms` is done more than once, deduct 1/2 usage point, not correctness (ditto for `set` on `rooms`).

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2005 A Question 2: Ticket Sales

Part A:	Advance	3 1/2 points
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- +1/2 `class Advance extends Ticket (no abstract)`
- +1/2 private data field (either days or price)
- +1 1/2 constructor
 - +1/2 correct header
 - +1 correctly assign data field(s) (lose if reference to super's private data)
- +1 `getPrice`
 - +1/2 correct header (must be public & double, no abstract, no parameters)
 - +1/2 return correct price

Part B:	StudentAdvance	5 1/2 points
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- +1/2 `class StudentAdvance extends Advance`
- +1 1/2 constructor
 - +1/2 correct header
 - +1/2 attempt to call `super`
 - +1/2 correct call to `super`
- +2 `getPrice`
 - +1/2 correct header (must be public & double, no abstract, no parameters)
 - +1 call `super.getPrice()`
 - +1/2 calculate and return correct price
- +1 1/2 `toString`
 - +1/2 call `super.toString()`
 - +1 return string with correct phrase concatenated (lose this with a reference to super class's private data)

Usage: -1/2 in part A if `super()` appears in the constructor and it is not the first statement executed.

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2005 A Question 3: ZigZag Fish

Part A:	<code>nextLocation</code>	5 points
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- +1/2 determine environment
- +1/2 determine current location (lose this if reference inaccessible field)
- +1/2 determine current direction (lose this if reference inaccessible field)
- +2 determine diagonal locations
 - +1/2 attempt to access any neighbor of current location
 - +1/2 correctly access either forward-diagonal location
 - +1 access correct diagonal (based on `willZigRight`)
- +1/2 check contents of diagonal location (`isEmpty`)
- +1 return location (in some context of `willZigRight`)
 - +1/2 next location (only if empty)
 - +1/2 current location (only if blocked)

Part B:	<code>move</code>	4 points
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- +1/2 call `nextLocation()`
- +1 check if no movement
 - +1/2 attempt
 - +1/2 correct
- +1 reverse direction
 - +1/2 attempt
 - +1/2 correct (only if blocked, lose this if reference inaccessible field)
- +1 1/2 move and update `willZigRight` (only if not blocked)
 - +1/2 `changeLocation(nextLoc)`
 - +1 correctly update `willZigRight`

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2005 A Question 4: Improving Grades

Part A:	<code>average</code>	3 points
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- +1/2 initialize `sum`
- +1 loop over `scores`
 - +1/2 attempt (must reference `scores` in body)
 - +1/2 correct (from first to last)
- +1/2 add score to `sum` (in context of loop)
- +1 calculate and return average
 - +1/2 attempt to calculate average
 - +1/2 return correct value
(Check for `int` division; must be `double` quotient)

Part B:	<code>hasImproved</code>	3 points
----------------	--------------------------	-----------------

- +1 loop over `scores`
 - +1/2 attempt (must reference `scores` in body)
 - +1/2 correct (will lose this if index out of bounds)
- +1 compare consecutive scores (in context of loop)
 - +1/2 attempt
 - +1/2 correct
- +1 return correct `boolean`
 - +1/2 categorize entire array as improved or not improved
(must be in context of comparing consecutive scores)
 - +1/2 correct value returned

Part C:	<code>finalAverage</code>	3 points
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- +1 call `hasImproved()`
 - +1/2 attempt
 - +1/2 correct
- +1 return average of last half
 - +1/2 attempt to average half using `average`
 - +1/2 return correct average (only if improved)
- +1 return average of all
 - +1/2 attempt to average all using `average`
 - +1/2 return correct average (only if not improved)

Note: Reimplementing code rather than calling available methods results in score of 0 for the portion of part C related to the code reimplementation.

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Question 1

PART A:

```
public Reservation requestRoom(String guestName)
{
    for (int i = 0; i < rooms.length; i++)
    {
        if (rooms[i] == null)
        {
            rooms[i] = new Reservation(guestName, i);
            return rooms[i];
        }
    }
    waitList.add(guestName);
    return null;
}
```

PART B:

```
public Reservation cancelAndReassign(Reservation res)
{
    int roomNum = res.getRoomNumber();
    if (waitList.isEmpty())
    {
        rooms[roomNum] = null;
    }
    else
    {
        rooms[roomNum] = new Reservation((String)waitList.get(0), roomNum);
        waitlist.remove(0);
    }
    return rooms[roomNum];
}
```

alternate solution

```
public Reservation cancelAndReassign(Reservation res)
{
    int roomNum = res.getRoomNumber();
    rooms[roomNum] = null;
    if (!waitList.isEmpty())
    {
        requestRoom((String)waitlist.get(0));
        waitlist.remove(0);
    }
    return rooms[roomNum];
}
```

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Question 2

PART A:

```
public class Advance extends Ticket
{
    private int daysInAdvance;

    public Advance(int numDays)
    {
        super();
        daysInAdvance = numDays;
    }

    public double getPrice()
    {
        if (daysInAdvance >= 10)
        {
            return 30.0;
        }
        else
        {
            return 40.0;
        }
    }
}
```

OR

```
public class Advance extends Ticket
{
    private double price;

    public Advance(int numDays)
    {
        super();
        if (numDays >= 10)
        {
            price = 30.0;
        }
        else
        {
            price = 40.0;
        }
    }

    public double getPrice()
    {
        return price;
    }
}
```

PART B:

```
public class StudentAdvance extends Advance
{
    public StudentAdvance(int numDays)
    {
        super(numDays);
    }

    public double getPrice()
    {
        return super.getPrice()/2;
    }

    public String toString()
    {
        return super.toString() + "\n(student ID required)";
    }
}
```

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Question 3

PART A:

```
protected Location nextLocation()
{
    Environment env = environment();
    Location loc = location();
    Direction dir = direction();

    Location forward = env.getNeighbor(loc, dir);
    Location nextLoc;
    if (willZigRight)
    {
        nextLoc = env.getNeighbor(forward, dir.toRight());
    }
    else
    {
        nextLoc = env.getNeighbor(forward, dir.toLeft());
    }

    if (env.isEmpty(nextLoc))
    {
        return nextLoc;
    }
    else
    {
        return loc;
    }
}
```

PART B:

```
protected void move()
{
    Location nextLoc = nextLocation();
    if (nextLoc.equals(location())) {
        changeDirection(direction().reverse());
    }
    else
    {
        changeLocation(nextLoc);
        willZigRight = !willZigRight;
    }
}
```

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Question 4

PART A:

```
public double average(int first, int last)
{
    double sum = 0.0;
    for (int i = first; i <= last; i++)
    {
        sum += scores[i];
    }
    return sum/(last-first+1);
}
```

PART B:

```
public boolean hasImproved()
{
    for (int k = 0; k < scores.length-1; k++)
    {
        if (scores[k] > scores[k+1])
        {
            return false;
        }
    }
    return true;
}
```

PART C:

```
public double finalAverage()
{
    if (hasImproved())
    {
        return average(scores.length/2, scores.length-1);
    }
    else
    {
        return average(0, scores.length-1);
    }
}
```