Interview Questions

I interviewed with a number of companies during the placement season 2010. Here is a compilation of the interview questions which I was asked.

1. WorldQuant:

(a) There are 6 couples (12 people). 4 people are selected at random. What is the probability that exactly one couple will be selected.

(b) A pawn is sitting at one corner of an 8X8 chess board. It can take one step at a time in the horizontal or vertical direction (not diagonal). What is total number of ways in which it can reach the diagonally opposite end given that the pawn always tries to go towards the destination (i.e. no back-tracking).

(c) A die is rolled several times and the number appearing is summed. We stop when this sum becomes greater than or equal to 100. What value of sum in the end is the most probable (out of 100, 101, 102, 103, 104, 105)

(d) There is a calculator in which all digits (0 to 9) and the basic arithmetic operators (+, -, *, /) are disabled. However other scientific functions are operational like exp, log, sin, cos, arc tan, etc. The calculator currently displays a 0. Convert this first to 2 and then to 3.

(e) You have a biased coin in which the probability of getting a head is 51%. Create an event out of this coin which has a probability of 25%.

(f) You have a large number of stocks (say 1000). The value (price) of these stocks is random in the short time but grows exponentially (at different rates) in the long run. You observe all the stock prices today. Which digit in the price of all these stocks appears maximum number of times.

(g) What is a virtual function.

(h) Which is the slowest operation in MATLAB.

2. Opera Solutions (Analytics):

(a) Guess estimate the rate of height growth of humans in km/ hr.

(b) A person has built a teleport machine which he wants to use for teleporting people from New York to London. The machine can carry only 1 person at a time and must to be kept idle for 1 hour after each teleport. The machine has costed him 1m $ and he must recover it in 1 year. What price should he charge his customers. Assume a business class airline ticket from New York to London is priced at $2000.

(c) What is a random number. Is there anything which is truly random.

(d) You have a flat file containing entries of credit card holder details (card no., name of holder and date of birth). You have another flat file containing entries of all the transactions executed with each credit card (credit card no., amount and date of purchase). So the common entry in both files is credit card no. We want to append the

card holders information against each transaction in the second file i.e. we want the second file to be modified to now contain entries with credit card no., amount, date of purchase, name of holder and date of birth. What is the most efficient way of doing this. The files are not sorted.

3. IBM- IRL:

(a) What is the time complexity for creation of heap from an array.

(b) Implement two queues using a single array. Space should not be wasted , for example if there is only one element in queue1 and n/2 in queue2, then a new element who wants to join the queue2 should not be dropped because there is still space in the array.

(c) You have a string of length n (odd) containing 1s and 0s. The character at each position of the string is decided by flipping a coin (head => 0, tail => 1). What is the probability of getting more 1s than 0s.

(d) Assume now that you have a number of such strings. Plot a graph between the y= no. of such strings and x= no. of 1s.

(e) Write a C code to fill up an nXn 2 D array as shown:

1	2	3	...	n
4n-1	4n			n+1
.				n+2
.				.
3n+1				.
3n	...	2n+2	2n+1	2n
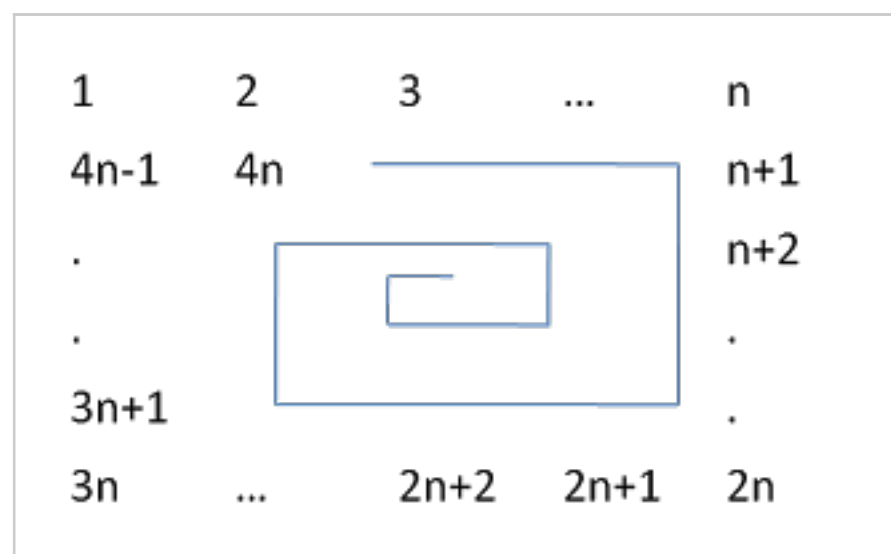
4. Hewlett- Packard:

(a) How would you find out if a number is prime in minimum time.

(b) There are 100 lockers in a room which are all open. There are 100 people. People enter in the room one by one. Each person toggles the lockers (closes if its open and vice-versa) which are multiples of his number in the line (for eg. person 2 will toggle lockers 2, 4, 6 .... 100, person 50 will toggle lockers 50, 100). What is the state of the lockers after the 100th person has passed. Write a code for the same.

(c) What will be the state of the lockers if there are only 50 people after the 50th person has passed.

(d) What is virtual memory and page fault. What is the condition in which processes spend more time paging then executing called.

(e) What is the best way to avoid/ reduce thrashing. What will happen if you reduce/ increase the (1) secondary memory (2) main memory.

(f) How do you decide the amount of space to be allocated for swap area. What is the optimum amount.

(g) What are the main differences between IPv4 and IPv6.

(h) What is the biggest problem with wireless communication today.

(i) How do you ensure security over a wireless channel. What is WEP security. What is the bit length.

(j) What is VLSI, MSI, SSI. What is the Moore's law.

5. Intel:

(a) Why are MOSFETs preferred over BJTs.

(b) What is the biggest problem with data centres (blade servers)

(c) What is the biggest problem/ challenge with processors and other semiconductor devices today.

(d) Why is the gate leakage current of MOSFETs increasing.