Exploring Careers

Hrithik Shah

August 19, 2016

# Part I

Name of Career: Game Developer

Description:

* Design initial concepts for games
* Generate game scripts and story boards
* Use 2D/3D modelling and animation software
* Program game using languages such as C++
* Test games for bugs
* Ensuring deadlines are met.

Salary:

* $35,000 ~ $130,000

Degree in:

* animation;
* computer games development or design;
* computer science;
* graphic design;
* interactive media;
* mathematics;
* multimedia design;
* physics;
* software engineering.

\*Entry without a degree is possible if you have relevant experience.

To become a game developer, it is recommended that one must have a degree in computer science or software engineering.

Universities that offer them:

* Waterloo (Software Engineering)
  + Admission Requirements
    - Strong performance in a programming course such as Grade 11 or 12 Computer and Information Science or equivalent
    - Strong performance in a programming contest
    - Significant work experience
* Cost
  + Tuition: $13,410 per year
  + Books, supplies: $2,000 per year
  + Total: $61,640
* Waterloo (Computer Science & Business Administration)
  + Admission Requirements:
    - 6 Grade 12 U and/or M courses including
    - Advanced Functions
    - Calculus and Vectors
    - Any Grade 12 U English
    - One other 4U course
    - Recommended course: Grade 11 U Introduction to Computer Science
    - Admission averages: Individual selection from the high 80s
    - You're strongly encouraged to write the Euclid Mathematics Contest.
  + Cost
    - Tuition: $12,354 per year
    - Books: $2000
    - Total: $57416
* Waterloo (Computer Science)
  + Admission Requirements:
    - 6 Grade 12 U and/or M courses including
    - Advanced Functions
    - Calculus and Vectors
    - Any Grade 12 U English
    - One other 4U course
    - Recommended course: Grade 11 U Introduction to Computer Science
    - Admission averages: Individual selection from the high 80s
    - You're strongly encouraged to write the Euclid Mathematics Contest.
  + Cost
    - Tuition: $6,234 per year
    - Books: $2000
    - Total: $32936

# Part II

1. Teamwork is much needed skill in any team. “If the team never gets along,” then the work won’t get done.
2. Be confident in the interview.
3. Show smartness and willingness to get things done.
4. Keep an open-mind and be ready for any questions
5. Be passionate about your responses. Show that you are interested.
6. Respond in a way so that anyone can understand what you are saying, not just your interviewers.
7. Know the basics really well because “if you can’t whiz through the easy stuff at 100 m.p.h., you’re never gonna get the advanced stuff.”
8. Make sure you understand major concepts like sorting algorithms or pointers.
9. Never be scared if you don’t know the answer to a question. Instead let the interviewer know how far you got into the problem and where you are stuck.
10. Remember past experience where you led your team to a certain goal.

Questions from Google:

<https://www.interviewcake.com/google-interview-questions>

1. A building has 100 floors. One of the floors is the highest floor an egg can be dropped from without breaking. If an egg is dropped from above that floor, it will break. If it is dropped from that floor or below, it will be completely undamaged and you can drop the egg again. Given two eggs, find the highest floor an egg can be dropped from without breaking, with as few drops as possible.
2. Write a function to find the 2nd largest element in a binary search tree ↴

Here's a sample binary tree node class:

1. class BinaryTreeNode:
2. def \_\_init\_\_(self, value):
3. self.value = value
4. self.left = None
5. self.right = None
6. def insert\_left(self, value):
7. self.left = BinaryTreeNode(value)
8. return self.left
9. def insert\_right(self, value):
10. self.right = BinaryTreeNode(value)
11. return self.right

3. You are a renowned thief who has recently switched from stealing precious metals to stealing cakes because of the insane profit margins. You end up hitting the jackpot, breaking into the world's largest privately owned stock of cakes—the vault of the Queen of England.

While Queen Elizabeth has a *limited number of types of cake*, she has an *unlimited supply of each type*.

Each type of cake has a weight and a value, stored in a tuple with two indices:

1. An integer representing the weight of the cake in kilograms
2. An integer representing the monetary value of the cake in British pounds

For example:

# weighs 7 kilograms and has a value of 160 pounds

(7, 160)

# weighs 3 kilograms and has a value of 90 pounds

(3, 90)

You brought a duffel bag that can hold limited weight, and you want to make off with the most valuable haul possible.

Write a function max\_duffel\_bag\_value() that takes a list of cake type tuples and a weight capacity, and returns the *maximum monetary value* the duffel bag can hold.

For example:

cake\_tuples = [(7, 160), (3, 90), (2, 15)]

capacity = 20

max\_duffel\_bag\_value(cake\_tuples, capacity)

# returns 555 (6 of the middle type of cake and 1 of the last type of cake)

Weights and values may be any non-negative integer. Yes, it's weird to think about cakes that weigh nothing or duffel bags that can't hold anything. But we're not just super mastermind criminals—we're also meticulous about keeping our algorithms flexible and comprehensive.

4. **You have a function** rand5() **that generates a random integer from 1 to 5. Use it to write a function** rand7() **that generates a random integer from 1 to 7.**

rand5() returns each integer with equal probability. rand7() must also return each integer with equal probability.

5. You left your computer unlocked and your friend decided to troll you by copying a lot of your files to random spots all over your file system.

Even worse, she saved the duplicate files with random, embarrassing names ("this\_is\_like\_a\_digital\_wedgie.txt" was clever, I'll give her that).

Write a function that returns a list of all the duplicate files. We'll check them by hand before actually deleting them, since programmatically deleting files is really scary. To help us confirm that two files are actually duplicates, return a list of tuples ↴ where:

* the first item is the duplicate file
* the second item is the original file

For example:

[('/tmp/parker\_is\_dumb.mpg', '/home/parker/secret\_puppy\_dance.mpg'),

('/home/trololol.mov', '/etc/apache2/httpd.conf')]

You can assume each file was only duplicated once.

Microsoft Interviews:

<https://www.glassdoor.ca/Interview/Microsoft-Interview-Questions-E1651.htm>

1. Print a Tree in level order in Zigzag way.

2. Swap Linked List nodes (odd even pair).

3. Design a Web crawler.

4. You have three water jugs, one holds 8 gallons, one 5, one 3. The 8 is full. By pouring water between jugs, fill two of the jugs with 4 gallons of water each.

5. Create a function that checks if a word is a palindrome.

# Part III

I feel that I need to work on my ability to write. In these past few years, my experiences with the subject English have not gone too well. It is by far my weakest strength. Even when I talk to family or friends, I find that sometimes my brain can’t process my thoughts into words. This will be a major drawback when I try and look for a job. Acquiring this skill will take lots of practice and time, but it will be a great tool to have in my toolbox.