|  |
| --- |
| **Academic Essay** |

The future of quantum computing

First, the term quantum computer sounds like its more unique than just a simple personal computer and it is. Quantum computer uses qubits and is based on quantum physics. While the classical computer has bits. Qubits have an ability to transform into 1 or 0 but it is not 1 or 0 at the same time, it is like a “levitating value” by what I mean it is quantum superposition. So, it is like a computer of the future. What is important about it that the quantum computer is much faster compared to the classic computer. To prove that, for instance lets take 4 bits that are used to encode information in binary for classic computers. A classic computer can now represent one of the 16 values ranging from 0 to 15. A quantum computer due to using cubits as a basic memory unit can represent all those 16 values at once. With those numbers it may sound like there is no difference, but now take 512 bits and let the computer represent values one by one whereas quantum computer will output all values at the same time. Otherwise, there is an issue with it as right now, quantum computers are being developed and there is still research happening on them as they are not fully stable. What I mean by not stable that there is still lack of excellent environment for them which they must stay at around 0 kelvin to reach that quantum environment. “In order to keep quantum computers stable, they need to be cold. That’s why the inside of D-Wave Systems’ quantum computer is -460 degrees Fahrenheit.” (Marr, n.d.) What we can understand is the issue is those computers cannot be used as personal computers right now as we cannot have 0 kelvin in our houses to have a quantum computer in it and a person with least computer knowledge could not do anything on it, but in the future, I believe there could be a possibility that quantum computers may become a daily thing for everyone. Also, I would consider quantum computers vulnerable as they can be affected by electromagnetic fields, temperature, air molecules which will just ruin the quantum environment, that will cause the system to crash. Paraphrased (Lu, n.d.)

Quantum computers could be used in many spheres: pharmaceuticals, databases, etc. Basically, where calculations are crucial and must be done in bulk. For pharmaceutical industry qubits are just like a simulation of a molecule that builds into formulas which means that there could be effective treatments for certain diseases which have no treatments right now. Paraphrased (TED, 2019, 00:00–10:04) Or database lookup, as quantum computer has qubits, the qubits itself in my opinion are almost opposite of bits that are in normal computers. So, when looking up a certain value in a huge database, the basic computer would compare each value in sequence which takes a long time while the quantum computer can compare all values at the same time and provide an output very quickly. My speculation is that quantum computers could be used for AI. Like advanced AI. As quantum computer can compare multiple values (thanks to qubits) at once and an image represented in binary that would be compared and much faster matched from the database or any source where the binary code is provided from rather than basic computer. Just imagine a self-driving vehicle that operates on a quantum computer, the AI level could even react much faster than a human. Also, I believe quantum computers could be used for hosting servers. For instance, imagine that you have a game server, but it would be a unique one, as you could have even 10000 or 100000 players on it and still if all of them would do any action at the same time, I believe this could be processed very fast without any lags to the server, except players they may experience lag or game crash as every action done on the server would render in sequence on their personal computers, so that means people would have to play these games on quantum computers too. Thinking deeply, quantum computers in the future could be used for military weapon turrets. The aiming system on not recognized targets could be improved for instance images are recognized by binary which would make it instant, as quantum computer can make calculations fast it could measure the distance between the turret and the target and calculate at which angle to shoot at the target. Either recognition, calculation by this invention could be improved. So far, those examples are related to computer science and consumer fields. These computers have a lot of potential which may not be fully uncovered yet. But as time passes, the science advances. We can expect quantum computers in the future that could run on home temperature that could not be interfered by heat or vibrations and would have a user-friendly interface. Everyone would be happy as governments, organizations, consumers, all parties would be happy as there would be a huge increase in performance.

References:

ColdFusion. (2019, May 27). *Quantum Computers - FULLY Explained!* [Video]. YouTube. https://www.youtube.com/watch?v=PzL-oXxNGVM

Lu, D. (n.d.). *What is a quantum computer?* New Scientist. Retrieved 14 April 2021, from https://www.newscientist.com/question/what-is-a-quantum-computer/

Marr, B. (n.d.). *15 Things Everyone Should Know About Quantum Computing*. Bernard Marr. Retrieved 14 April 2021, from https://www.bernardmarr.com/default.asp?contentID=1193

TED. (2019, February 1). *A beginner’s guide to quantum computing | Shohini Ghose* [Video]. YouTube. https://www.youtube.com/watch?v=QuR969uMICM

|  |
| --- |
| **Source Code** |

<https://dev.azure.com/nagrag4/_git/Dungeon%20Crawler>

*#include "Player.h"*

Player**::**Player**()**

**{**

name**=**""**;** PlayerClass**=**""**;** gender**=**""**;** weapondamage**=5;** weaponequipped**=**"basic sword"**;**

playerClass**={**"tank"**,** "balanced"**,** "mage"**};**

gold**=0;** exp**=0;** potion**=0;** level**=0;**

settotalhealth**(0);**

settotalmana**(0);**

setstamina**(0);**

**}**

**void** Player**::**playerCreation**(){**

**int** count**=5;**

std**::**cout **<<** "What is your player name?" **<<** std**::**endl**;**

std**::**cin **>>** name**;**

std**::**cout **<<** "What class do you want to pick for " **<<** name **<<** "?" **<<** std**::**endl**;**

std**::**cin **>>** PlayerClass**;**

std**::**for\_each**(**PlayerClass**.**begin**(),** PlayerClass**.**end**(),** **[](char&**c**){**

c**=** **::**tolower**(**c**);**

**});**

**if(**PlayerClass**==**"tank"**)**

**{**

settotalhealth**(100);**

settotalmana**(50);**

setstamina**(40);**

**}**

**else** **if(**PlayerClass**==**"balanced"**)**

**{**

settotalhealth**(60);**

settotalmana**(70);**

setstamina**(65);**

**}**

**else** **if(**PlayerClass**==**"mage"**)**

**{**

settotalhealth**(30);**

settotalmana**(100);**

setstamina**(90);**

**}**

**else**

**{**

settotalhealth**(50);**

settotalmana**(50);**

setstamina**(50);**

**}**

std**::**cout **<<** "What gender is " **<<** name **<<** "?" **<<** std**::**endl**;**

std**::**cin **>>** gender**;**

**for(int** i**=0;** i**<**count**;** i**++)**

**{**

std**::**cout **<<** "Please wait while your character is being created.... Time elapsed " **<<** i **<<** std**::**endl**;**

Sleep**(350);** *//reference https://www.softwaretestinghelp.com/cpp-sleep/ this makes a delay before the screen will be cleared out*

system**(**"cls"**);** *// reference https://mathbits.com/MathBits/CompSci/Screen/clear.htm this clears out the screen*

**}**

name**[0]=**toupper**(**name**[0]);**

PlayerClass**[0]=**toupper**(**PlayerClass**[0]);**

gender**[0]=**toupper**(**gender**[0]);**

**}**

*#pragma once*

*#include "Header.h"*

**class** Player

**{**

private:

**int** totalhealth**;**

**int** totalmana**;**

**int** totalstamina**;**

public:

Player**();**

std**::**string name**,** gender**,** weaponequipped**;**

**int** weapondamage**,** potion**,** level**,** exp**;**

std**::**vector**<**std**::**string**>** playerClass**;**

std**::**string PlayerClass**;**

**int** gold**;**

**void** settotalhealth**(int** health**)**

**{**

totalhealth **=** health**;**

**}**

**void** damagetotalhealth**(int** damage**)**

**{**

totalhealth **=** totalhealth **-** damage**;**

**}**

**int** gettotalhealth**()**

**{**

**return** totalhealth**;**

**}**

**void** increasetotalhealth**(int** heal**)**

**{**

totalhealth **=** totalhealth **+** heal**;**

**}**

**void** settotalmana**(int** mana**)**

**{**

totalmana **=** mana**;**

**}**

**void** addmana**(int** manaincrease**)**

**{**

totalmana **=** totalmana **+** manaincrease**;**

**}**

**void** usemana**(int** manause**)**

**{**

totalmana **=** totalmana **-** manause**;**

**}**

**void** setstamina**(int** stamina**)**

**{**

totalstamina **=** stamina**;**

**}**

**void** decreasestamina**(int** staminadecrease**)**

**{**

totalstamina **=** totalstamina **-** staminadecrease**;**

**}**

**void** increasestamina**(int** staminaincr**)**

**{**

totalstamina **=** totalstamina **+** staminaincr**;**

**}**

**int** getstamina**()**

**{**

**return** totalstamina**;**

**}**

**int** gettotalmana**()**

**{**

**return** totalmana**;**

**}**

**void** playerCreation**();**

**};**

**void** gamemenu**()**

**{**

**int** gselection**;**

std**::**cout **<<** "Game Menu" **<<** std**::**endl **<<** "Please choose an option by writing a number and pressing enter" **<<** std**::**endl**;**

std**::**cout **<<** "1. Start" **<<** std**::**endl **<<** "2. Instructions" **<<** std**::**endl **<<** "3. Exit" **<<** std**::**endl**;**

std**::**cin **>>** gselection**;**

**if** **(**gselection **==** **1)**

**{**

player**.**playerCreation**();**

**}**

**else** **if** **(**gselection **==** **2)**

**{**

**int** nzz**;**

std**::**cout **<<** "To play this game, you must choose an option 1. Start; Then you will have to choose your \n character name, class(we have 3 classes available! tank, balanced, mage, later after you dip into dungeon floor you will engage in combat with various monsters, as you progress you will \n earn experience which will make you level up your \n character which makes your character stronger, gold that you can spend on weapons or potions that will make your character stronger \n also the monsters will become stronger" **<<** std**::**endl**;**

std**::**cout **<<** "Input 1 to return to main menu" **<<** std**::**endl**;**

std**::**cin **>>** nzz**;**

**if** **(**nzz **==** **1)**

**{**

gamemenu**();**

**}**

**}**

**else** **if** **(**gselection**==3)**

**{**

exit**(0);**

**}**

**}**