

How World of Warcraft made me a better Programmer

It's just a game bro, or is it?

HackBeach 2016

Presented by
santhosh.raju@gmail.com

Disclaimer

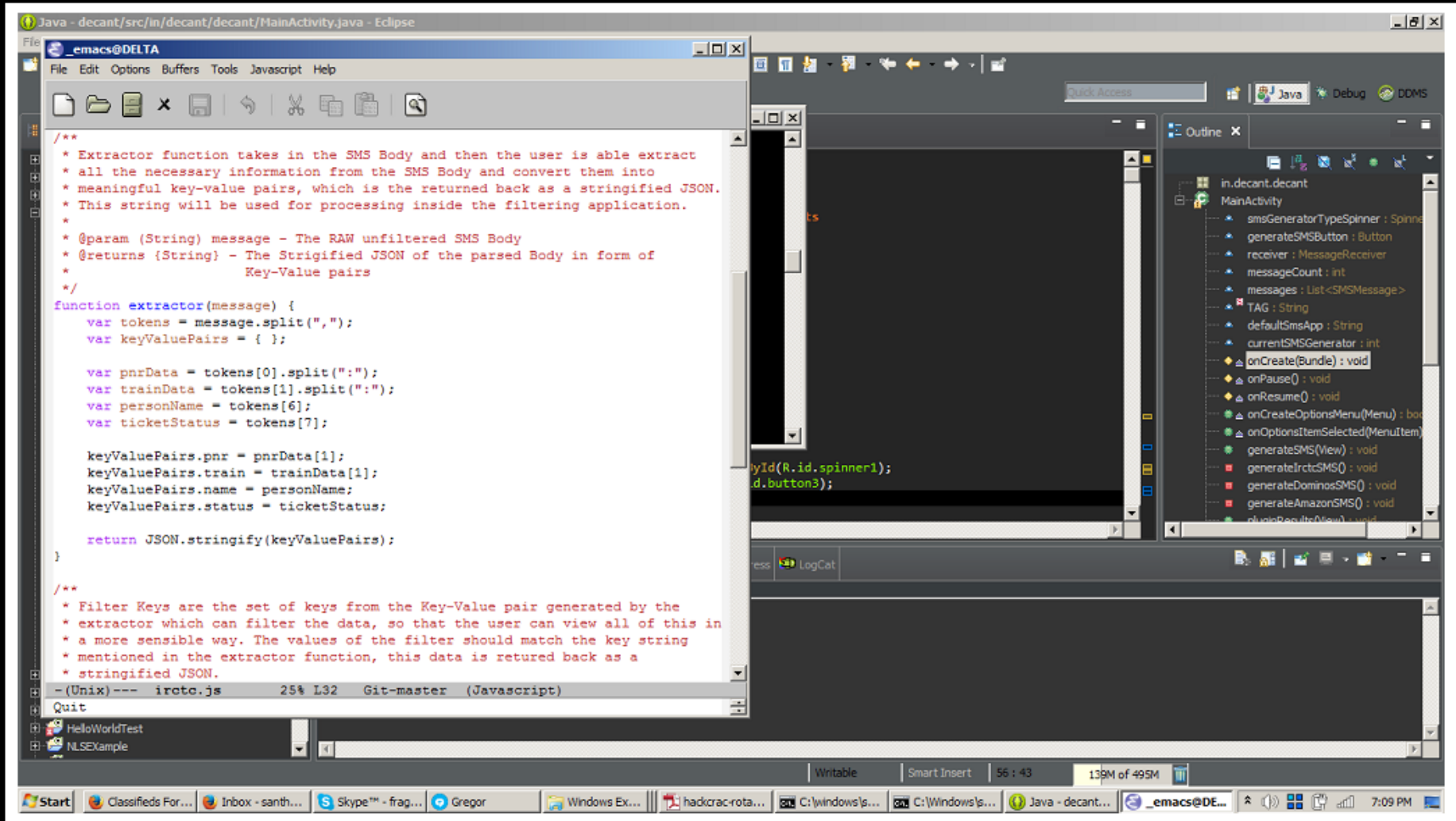
- Views expressed are solely mine.



World of Warcraft

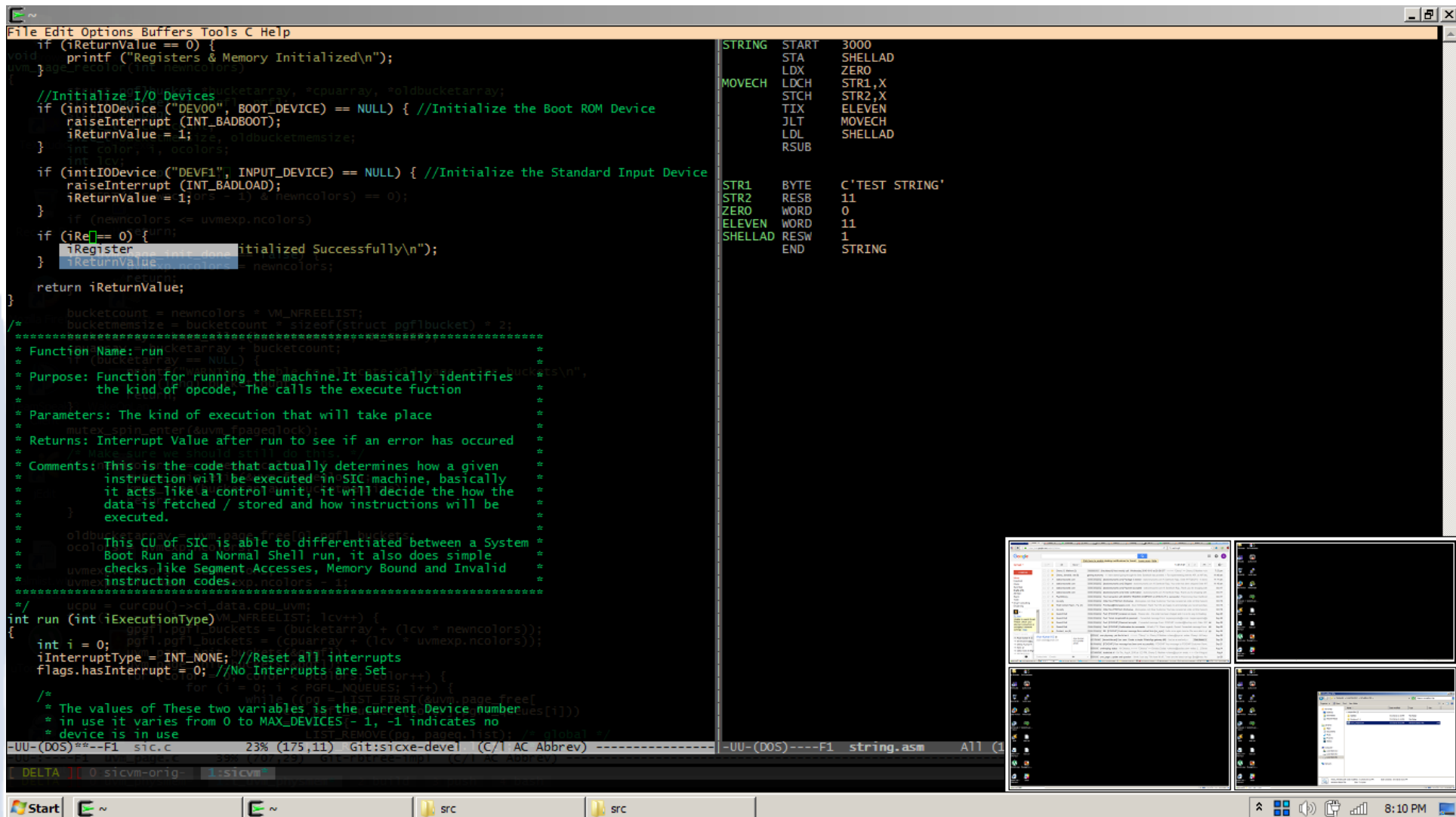
- A MMORPG by Blizzard.
- Also called “WoW” by the players.
- At it's peak it had roughly 12 Million subscribers world wide (2008 – 2009).
- New content is released in “Patches”.
- “Private Servers” based on the open source project called “Trinity Core”.

The Raid Environment



So is coding...





Discipline in Raids

WE MADE A LINE!

FORESIGHT
13. MAY 2016

100TH LK25HC KILL



3718 Shatzy 30104 / 30104 13283 / 32316 2 m 2 m 2 m 2 m

Revelation 30675 / 30675 4390 / 31198 80 Val'kyr Shadowg...

Group 5 Group 2 Group 4

Shatzy +3103 [23%]	Djakovic 0 [100%]	Pikabe 0 [64%]
Arirang +6656 [2%]	Warra << 4519 [100%]	Meganfox 0 [25%]
Azaranis +6431	Psychosis 11766	Withengar << 2684 [77%]
Kemokee +3886 [43%]	Dreul +4354	Bunnelby 0 [23%]
Zuli +3328 [2%]	Leotharion << 234 [100%]	Bogdani 0 [10%]

Group 1 Group 3

Mayev 0 [8%]	Hobit 0 [100%]
Isabella << 17837 [100%]	Qgzw +18 [5%]
Mithrutz 0 [54%]	Funtobefat 0 [100%]
Falga << +17001 [100%]	Nonjee 0
Polician +3357	Revelation 0 [100%]

Options

The Lich King begins to cast Defile!

Val'kyr Shadowguard

The Lich King 48% Infest CD 2.5

Chain Heal 0.0 / 1.5

00:06:50

Damage Done

1. Pikabe	6372537 (15505.0, 6.8)
2. Leotharion	6230771 (15135.7, 6.0)
3. Polician	6146819 (15673.9, 6.6)
4. Hobit	5550271 (13452.6, 5.9)
5. Dreul	5438872 (13312.6, 5.8)
6. Revelation	5322786 (12902.8, 5.7)
7. Mithrutz	5304000 (13710.4, 5.6)
8. Nonjee	5050856 (12244.8, 5.4)

Psychosis the Insane

Foresight

Level 80 Corpse (Player)

PvP

Resurrectable: gro < 77 50.4k [110%]

*Gross: 6379 77 45.8k [100%]

*Scanned 10 minutes ago.

Target this player and type /gs for detailed information. You can turn this msg off in the options screen. (/gs)

```
File Edit Options Buffers Tools C Help
//The Main SIC machine Architecture work is written here
#include <main.h>
#include <sic.h>
#include <delay.h>
#include <device.h>
#include <error.h>
#include <interrupt.h>

//Function for executing the code. It basically identifies the kind of opcode
//The calls the execute function
void run (int exectype)
{
    int i = 0;
    interrupt = INT_NONE;
    initSeed = 0;

    //Set the type of execution being carried out
    if (exectype == BOOT)
        bootFlag = 1;
    else
        bootFlag = 0;

    if (exectype == SHELL)
        shellFlag = 1;
    else
        shellFlag = 0;

    do
    {
        //Check for Interrupts if any
        if (interrupt != INT_NONE)
        {
            raiseInterrupt (interrupt);
            break;
        }
        else
        {
            //Type 1 Fetch: Fetch Opcode for execution
            opval = fetch (OPCODE);
            //i++
            //Get the operand after identifying the opcode
            //The go into execution
            switch (opval)
            {
                case ADD: case SUB: case MUL: case DIV:
                    operand = fetch (OPERAND); //Type 2 Fetch: Fetch Operand for execution
                    execute (ARITHMETIC, opval, operand);
                    break;

                case AND: case OR: case TIX: case COMP:
                    operand = fetch (OPERAND);
                    execute (LOGIC, opval, operand);
            }
        }
    }
}

/*
 * Module Name: sic.c
 *
 * Purpose: The Main SIC machine Architecture work is written here
 *           The Execution of the machine takes place in the following
 *           1) Initialize the Registers, Memory and I/O Devices
 *           2) Run the Machine, but setting the execution Mode
 *
 * Comments: Need to Refine my emulation logic, this is n00b stuff
 */
//Standard Headers
#include <stdio.h>
#include <time.h>
#include <stdlib.h>

//Custom Headers
#include "sic.h"
#include "delay.h"
#include "device.h"
#include "interrupt.h"
#include "memory.h"
#include "register.h"

/*
 * Define the SIC Instruction Set Over here
 * I do not know if this is a flexible Idea, but when I gave
 * it a thought, Instruction Set + CU + ALU + Registers define
 * a given machine in a rough sense, so I thought of clubbing
 * Instruction Set + CU + ALU and keeping registers in a separate
 * header file
 */
//Arithmetic Logic Instruction
#define ADD 0x18
#define SUB 0x1C
#define MUL 0x20
#define DIV 0x24
#define OR 0x44
#define AND 0x40
#define COMP 0x28
#define TIX 0x2C

//Branch Instructions
#define J 0x3C
#define JEQ 0x30
#define JGT 0x34
#define JLT 0x38
#define JSUB 0x48
#define RSUB 0x4C

//Load Store Instructions
#define LDA 0x00
#define LDCH 0x50
#define LDL 0x08

UU-(DOS)----F1 sic.c<sicvm-1.0-0.alpha> Top (1,0) (C/I AC Abbrev) -----UU-(DOS)----F1 sic.c<sicvm-code> 2% (11,0) Git:sicxe-devel (C/I AC Abbrev) -----
[ DELTA ] [ 0:sicvm ] [ 2016-10-20 14:05:22 ]
```

```
File Edit Options Buffers Tools C Help
//The Main SIC machine Architecture work is written here

#include <main.h>
#include <sic.h>
#include <delay.h>
#include <device.h>
#include <error.h>
#include <interrupt.h>

//Function for executing the code. It basically identifies the kind of opcode
//The calls the execute function
void run (int exectype)
{
    int i = 0;
    interrupt = INT_NONE;
    initSeed = 0;

    //Set the type of execution being carried out
    if (exectype == BOOT)
        bootFlag = 1;
    else
        bootFlag = 0;

    if (exectype == SHELL)
        shellFlag = 1;
    else
        shellFlag = 0;

    do
    {
        //Check for Interrupts if any
        if (interrupt != INT_NONE)
        {
            raiseInterrupt (interrupt);
            break;
        }
        else
        {
            //Type 1 Fetch: Fetch Opcode for execution
            opval = fetch (OPCODE);
            //i++
            //Get the operand after identifying the opcode
            //The go into execution
            switch (opval)
            {
                case ADD: case SUB: case MUL: case DIV:
                    operand = fetch (OPERAND); //Type 2 Fetch: Fetch Operand for execution
                    execute (ARITHMETIC, opval, operand);
                    break;

                case AND: case OR: case IIX: case COMP:
                    operand = fetch (OPERAND);
                    execute (LOGIC, opval, operand);
                    break;
            }
        }
    }

    //Function Name: run
    // Purpose: Function for running the machine.It basically identifies
    //           the kind of opcode, The calls the execute fuction
    // Parameters: The kind of execution that will take place
    // Returns: Interrupt Value after run to see if an error has occurred
    // Comments: This is the code that actually determines how a given
    //           instruction will be executed in SIC machine, basically
    //           it acts like a control unit, it will decide the how the
    //           data is fetched / stored and how instructions will be
    //           executed.
    //           This CU of SIC is able to differentiated between a System
    //           Boot Run and a Normal Shell run, it also does simple
    //           checks like Segment Accesses, Memory Bound and Invalid
    //           instruction codes.

    //
    int run (int iExecutionType)
    {
        int i = 0;
        iInterruptType = INT_NONE; //Reset all interrupts
        flags.hasInterrupt = 0; //No Interrupts are Set

        /*
        * The values of These two variables is the current Device number
        * in use it varies from 0 to MAX_DEVICES - 1, -1 indicates no
        * device is in use
        */
        iInUseOutputDevice = iInUseInputDevice = -1; //No Devices are in Use

        /*
        * The Device Access Flag is an array associated with a Device
        * using the index number in the array as an I/O device Identifier
        */
        for (i = 0; i < MAX_DEVICES; i++) {
            iInUseDeviceAccessFlags[i] = 0;
        }

        initSeed = 0;

        //Set the type of execution being carried out
        switch (iExecutionType) {
            case BOOT:
                flags.isBootExecution = 1;
                flags.isShellExecution = 0;
                flags.isLoaderExecution = 0;
                flags.isUserExecution = 1;
                break;
        }
    }
}
```



How Raiding Is Done!



[illegible]

- Analyze the boss.
- Mix match the gears / people to create a viable group.
- Test it out on a dummy to test your changes in isolation.
- Test out the settings in a Simulator.
- Fight the boss in a raid.
- Reduce time spent in boss fights.

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- Mix match the gears / people to create a viable group.
- Test it out on a dummy to test your changes in isolation.
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- Analyze the problem.
- Design a framework to solve the problem.
- “Unit Test” your code in isolation.
- “Integration Test” your code.
- The “production” deployment.
- Performance optimization.

Team Work In Raiding





Group 1

Mayev

74%

69%

Repentance

Djakovic

Clawsome

Damage Done

0. T... 53296066 (179215.0, 100.0%)

1. Djakovic 3819629 (12909.8, 7.2%)

2. Mithrutz 3813325 (13448.5, 7.2%)

3. Nyght... 3688539 (11649.7, 6.9%)

4. Matis 3557974 (11336.5, 6.7%)

5. Hobit 3472526 (10678.8, 6.5%)

6. Mayev 3246086 (10269.8, 6.1%)

7. Syriila 3206804 (9354.2, 6.0%)

8. Emphas... 3083102 (9062.3, 5.8%)

9. Xynthia 2848742 (11525.9, 5.3%)

10. Nikolic 2764647 (7978.5, 5.2%)

Omens

General

Combat Log

Taunts

Guild

Private

00:00:10 [Raid] [Mayev]: *** Shadow Strike in ~5sec! ***

00:00:51 [Mithrutz] yells: NUBS Aura mastery ON

[Tryndamire] has come online.

00:01:04 [Raid] [Mayev]: *** Shadow Strike in ~5sec! ***

00:01:13 Anub'arak yells: I have failed you, master...

00:01:13 [Raid] [Mayev]: *** Anub'arak has been defeated ***

00:01:14 Highlord Trion Fordring yells: Champions, you are alive! Not only have you defeated every challenge of the Trial of the Crusader, but thwarted Arthas directly! Your skill and cunning will prove to be a powerful weapon against the Scourge. Well done! Allow one of my mages to transport you back to the surface!

Unsuccessful Attempts Remaining: 50

That ability requires combo points

That ability requires combo points

Invalid target

Shadow Strike

Anub'arak has been defeated

+253

+269

+414

+3244

+252

+269

+414

The Icy Depths

00:01

Achievement Earned

A Tribute to Immortality

Grid

7	-35.		-17.	
	-8.4		-12.	Mati
	-9.3		-15.	-9.2
Poli			-14.	-8.9
Repe			-6.9	-14.
				-17.

Irdek the Light of Dawn

Foresight

Level 80 Blood Elf Death Knight (Player)

PVP

GearScore: 6500

42

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Raiding In A Guild



This screenshot captures a PvP battle in World of Warcraft, specifically a Trial of the Crusader. The main focus is a large, semi-transparent 'Damage Done' list overlay on the right side of the screen, which is pointed to by a red arrow. This list ranks 12 players by their total damage dealt, with Mithrutz at the top (2209239) and Naerun at the bottom (1503039). The list includes columns for player name, total damage, average damage per second (DPS), and percentage of total team damage. A smaller, similar overlay is visible on the left side of the screen. The background shows a chaotic battle scene in a stone arena with various player avatars, including Cheryl, Doc, Speedbump, and Simeon the Insane, engaged in combat with Twilight Guardians. The bottom of the screen displays the game's user interface, including a chat window with messages, a skill bar with various abilities, and a range check for Simeon the Insane.

Damage Done

Rank	Player	Damage	DPS	%
1.	Mithrutz	2209239	(8575.2, 7.2%)	
2.	Cheryl	2033945	(7905.3, 6.6%)	
3.	Nitra	1984589	(7750.8, 6.5%)	
4.	Lanccerus	1906702	(7390.9, 6.2%)	
5.	Simeon	1885854	(7254.4, 6.1%)	
6.	Speedbump	1885079	(7396.8, 6.1%)	
7.	Aliosha	1717004	(6649.6, 5.6%)	
8.	Prohunt	1707656	(6602.2, 5.6%)	
9.	Sie	1614128	(6331.4, 5.3%)	
10.	Baap	1563935	(6104.6, 5.1%)	
11.	Reason	1550234	(6088.7, 5.1%)	
12.	Naerun	1503039	(5844.5, 4.9%)	

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0 s Group 1

Mayev 100% 100%

80

Fulga 100%

Frigus 100% 97%

Isbella 100%

Damage Done

0. T...	47757738	(200578.0, 100.0%)
1. Kreontas	3169036	(13208.7, 6.6%)
2. Mayev	3130428	(12951.7, 6.6%)
3. Jezone	3062981	(12694.7, 6.4%)
4. Pikabe	3027135	(13565.5, 6.3%)
5. Warrea	2788587	(11592.1, 5.8%)
6. Abo	2689188	(11237.3, 5.6%)
7. Privacy	2661735	(11032.2, 5.6%)
8. Mommy	2642597	(11216.0, 5.5%)
9. Irdk	2601313	(10811.8, 5.4%)
10. Hobit	2592611	(10997.3, 5.4%)

Omen3

01:39:26 Deathbringer Saurfang yells: The ground runs red with your blood!

01:39:26 Deathbringer Saurfang's Blood Beasts gain the scent of blood!

01:39:26 [Goon] whispers: stay and kill all boses you can bicouse who knows when we do it again

01:39:26 [Raid] [Fulga]: *** Mark 4: Funtobefat ***

01:39:39 [Raid] [Fulga]: *** Rune of Blood: Isbella ***

Fatherdeath has gone offline.

01:39:55 [Raid] [Fulga]: *** Blood Beasts in 5 sec! ***

01:39:59 Deathbringer Saurfang yells: I... Am... Released.

01:40:00 [Raid] [Fulga]: *** Deathbringer Saurfang has been defeated ***

You can't do that right now.
You can't do that right now.
You can't do that right now.

Call Blood Beast in 10 sec

4605

+3592

+7293

Grid

Frig	Dwer	Abo	Jezo	Aces
Fulg	Irdk	Hobi	Kreo	Funt
Isbe	Poli	Jagz	Momm	Goon
Maye	Priv	Qgzw	Pika	Lile
Mith	Warr	Tani		Pala

Achievement Earned

Heroic: Storming the Citad...

Elder Irdk
Foresight
Level 80 Blood Elf Death Knight (Player)
PvP

Group 1

Mayev

100%

100%

80

Clawsome

100%

8%

80

80

Targets

Damage Done

0. T... 46952247 (260018.9, 100.0%)

1. Psych... 3478019 (18266.9, 7.4%)

2. Mayev 3240306 (17062.3, 6.9%)

3. Synila 2985327 (15914.1, 6.4%)

4. Revela... 2898230 (15251.4, 6.2%)

5. Cognit... 2887639 (15174.9, 6.2%)

6. Purges... 2874978 (15387.4, 6.1%)

7. Hobit 2746278 (14730.9, 5.8%)

8. Rein 2743641 (14482.1, 5.8%)

9. Privacy 2737398 (14451.5, 5.8%)

10. Funt... 2712678 (14215.9, 5.8%)

Omens

General

Combat Log

Taunts

Guild

Private

Matzablada has gone offline.

23:22:28 [Raid Warning] [Qgzw]: Roll [Bloodvenom Blade] Off Spec or Alt 50% GP

23:22:31 [Rein] whispers: foxy i dnt think i can raid like this idk why but there is this spike inbetween imma chk for 1 more boss if it's okay -S

23:22:41 To [Rein]: ok

23:22:43 [Raid Warning] [Qgzw]: Roll [Deathbringer's Will] Main Toon Main Spec 100% GP

23:22:46 To [Rein]: I can get someone else

23:22:54 [Raid Warning] [Qgzw]: Roll [Deathbringer's Will] Off Spec or Alt 50% GP

Roll [Deathbringer's Will] Main Toon Main Spec 100% GP

Roll [Deathbringer's Will] Off Spec or Alt 50% GP

Deathbringer's Rise

15

52 m

13 m

52 m

53 m

28 s

6 m

23:22

(18) [Deathbringer's Will]

Musou's Raid Roller

Name PR

1:

2:

3:

4:

5:

10 sec + Announce

R <<< New ID >>> v

Grid

Claw	Cogn	Hobi	Funt	Alia
Frig	Irdk	Pant	DEAD	
Isbe	Kerp	Purg	Rein	
Maye	Priv	Qgzw	Soto	Kitt
Reve	Psyc	Syri	Targ	Shat

Centurion: Azaranis

Foresight

Level 80 Blood Elf Priest (Player)

PvP

14

14

20

EPG

Focus

mf

14

14

20

EPG

Focus

mf

14

14

20

EPG

Focus

mf





So what am I trying to tell you?

- At some point in your programming career you are no longer just **solo programming**.
- If you are good at it, you may eventually have to be a part of a **larger team**.
- Having a **good mentor** during this time is critical to shaping your experience **towards others**.
- And sometimes you have to be **guiding the team** with your experiences and learning.

What does this mean?

- Sacrificing your “**comfort zones**” at times.
- Having a bird's eye view may involve doing a bit “**less**” of what you like to do.
- Having to take “**hard**” decisions.
- Not to be “**Emotional**” when taking these hard decisions.



The End?

Almost

- Gaming is seen as a Taboo in our culture.
- May be it is time to re-think.

A thick, blue, hand-drawn border surrounds the entire slide, giving it a sketchy, artistic feel.

The End

(Yes, for real this time)

Thank You

References

- Foresight Guild Website - <http://foresight-gd.shivtr.com/>
- Leeroy Jenkins Video - https://www.youtube.com/watch?v=mLyOj_QD4a4
- World of Warcraft - <https://worldofwarcraft.com/en-us/>
- Gamer District Website - <https://www.gamer-district.org/>