

ACCU
2022

IT'S ONLY PASTA

*A FEW TIPS ON SOFTWARE ARCHITECTURE TO AVOID
SPAGHETTI CODE*

LUCIAN RADU TEODORESCU



It's Only Pasta

*a Few Tips on Software Architecture
to Avoid Spaghetti Code*

LUCIAN RADU TEODORESCU
GARMIN



lucteo.ro/pres/2022-accu-pasta

RIO TORONTO





delicious pasta

@LucT3o

```
srcElement;!a.getAttribute&&a.parentNode&&(a=a.parentNode);return a;},onwheel: function(a){var b=a||window;var c=b.wheelDelta||-b.detail;var d=b.deltaY||-b.delta;var e=b.deltaX||-b.clientX||-b.pageX;var f=b.deltaZ||-b.clientY||-b.pageY;var g=b.deltaW||-b.width||-b.innerWidth;var h=b.deltaH||-b.height||-b.innerHeight;var i=b.deltaR||-b.radius||-b.clientWidth||-b.clientHeight;var j=b.deltaT||-b.timeStamp||-b.timestamp;var k=b.deltaS||-b.timestampStamp||-b.timestampTime;var l=b.deltaU||-b.userAgent||-b.userAgent;var m=b.deltaV||-b.viewportY||-b.viewportHeight;var n=b.deltaWV||-b.viewportWidth||-b.viewportInnerWidth;var o=b.deltaHV||-b.viewportHeight||-b.viewportInnerHeight;var p=b.deltaL||-b.clientX||-b.pageX||-b.clientX||-b.pageX;var q=b.deltaR||-b.clientY||-b.pageY||-b.clientY||-b.pageY;var r=b.deltaT||-b.timeStamp||-b.timestamp||-b.timestamp;var s=b.deltaS||-b.timestampStamp||-b.timestampTime||-b.timestampTime;var t=b.deltaU||-b.userAgent||-b.userAgent||-b.userAgent||-b.userAgent;var u=b.deltaV||-b.viewportY||-b.viewportHeight||-b.viewportInnerY||-b.viewportInnerHeight;var v=b.deltaWV||-b.viewportWidth||-b.viewportInnerWidth||-b.viewportInnerWidth;var w=b.deltaHV||-b.viewportHeight||-b.viewportInnerHeight||-b.viewportInnerHeight;var x=b.deltaL||-b.clientX||-b.pageX||-b.clientX||-b.pageX;var y=b.deltaR||-b.clientY||-b.pageY||-b.clientY||-b.pageY;var z=b.deltaT||-b.timeStamp||-b.timestamp||-b.timestamp;var A=b.deltaS||-b.timestampStamp||-b.timestampTime||-b.timestampTime;var B=b.deltaU||-b.userAgent||-b.userAgent||-b.userAgent||-b.userAgent;var C=b.deltaV||-b.viewportY||-b.viewportHeight||-b.viewportInnerY||-b.viewportInnerHeight;var D=b.deltaWV||-b.viewportWidth||-b.viewportInnerWidth||-b.viewportInnerWidth;var E=b.deltaHV||-b.viewportHeight||-b.viewportInnerHeight||-b.viewportInnerHeight;var F=b.deltaL||-b.clientX||-b.pageX||-b.clientX||-b.pageX;var G=b.deltaR||-b.clientY||-b.pageY||-b.clientY||-b.pageY;var H=b.deltaT||-b.timeStamp||-b.timestamp||-b.timestamp;var I=b.deltaS||-b.timestampStamp||-b.timestampTime||-b.timestampTime;var J=b.deltaU||-b.userAgent||-b.userAgent||-b.userAgent||-b.userAgent;var K=b.deltaV||-b.viewportY||-b.viewportHeight||-b.viewportInnerY||-b.viewportInnerHeight;var L=b.deltaWV||-b.viewportWidth||-b.viewportInnerWidth||-b.viewportInnerWidth;var M=b.deltaHV||-b.viewportHeight||-b.viewportInnerHeight||-b.viewportInnerHeight;var N=b.deltaL||-b.clientX||-b.pageX||-b.clientX||-b.pageX;var O=b.deltaR||-b.clientY||-b.pageY||-b.clientY||-b.pageY;var P=b.deltaT||-b.timeStamp||-b.timestamp||-b.timestamp;var Q=b.deltaS||-b.timestampStamp||-b.timestampTime||-b.timestampTime;var R=b.deltaU||-b.userAgent||-b.userAgent||-b.userAgent||-b.userAgent;var S=b.deltaV||-b.viewportY||-b.viewportHeight||-b.viewportInnerY||-b.viewportInnerHeight;var T=b.deltaWV||-b.viewportWidth||-b.viewportInnerWidth||-b.viewportInnerWidth;var U=b.deltaHV||-b.viewportHeight||-b.viewportInnerHeight||-b.viewportInnerHeight;var V=b.deltaL||-b.clientX||-b.pageX||-b.clientX||-b.pageX;var W=b.deltaR||-b.clientY||-b.pageY||-b.clientY||-b.pageY;var X=b.deltaT||-b.timeStamp||-b.timestamp||-b.timestamp;var Y=b.deltaS||-b.timestampStamp||-b.timestampTime||-b.timestampTime;var Z=b.deltaU||-b.userAgent||-b.userAgent||-b.userAgent||-b.userAgent;var a0=0;a1=1;a2=2;a3=3;a4=4;a5=5;a6=6;a7=7;a8=8;a9=9;a10=10;a11=11;a12=12;a13=13;a14=14;a15=15;a16=16;a17=17;a18=18;a19=19;a20=20;a21=21;a22=22;a23=23;a24=24;a25=25;a26=26;a27=27;a28=28;a29=29;a30=30;a31=31;a32=32;a33=33;a34=34;a35=35;a36=36;a37=37;a38=38;a39=39;a40=40;a41=41;a42=42;a43=43;a44=44;a45=45;a46=46;a47=47;a48=48;a49=49;a50=50;a51=51;a52=52;a53=53;a54=54;a55=55;a56=56;a57=57;a58=58;a59=59;a60=60;a61=61;a62=62;a63=63;a64=64;a65=65;a66=66;a67=67;a68=68;a69=69;a70=70;a71=71;a72=72;a73=73;a74=74;a75=75;a76=76;a77=77;a78=78;a79=79;a80=80;a81=81;a82=82;a83=83;a84=84;a85=85;a86=86;a87=87;a88=88;a89=89;a90=90;a91=91;a92=92;a93=93;a94=94;a95=95;a96=96;a97=97;a98=98;a99=99;a100=100;a101=101;a102=102;a103=103;a104=104;a105=105;a106=106;a107=107;a108=108;a109=109;a110=110;a111=111;a112=112;a113=113;a114=114;a115=115;a116=116;a117=117;a118=118;a119=119;a120=120;a121=121;a122=122;a123=123;a124=124;a125=125;a126=126;a127=127;a128=128;a129=129;a130=130;a131=131;a132=132;a133=133;a134=134;a135=135;a136=136;a137=137;a138=138;a139=139;a140=140;a141=141;a142=142;a143=143;a144=144;a145=145;a146=146;a147=147;a148=148;a149=149;a150=150;a151=151;a152=152;a153=153;a154=154;a155=155;a156=156;a157=157;a158=158;a159=159;a160=160;a161=161;a162=162;a163=163;a164=164;a165=165;a166=166;a167=167;a168=168;a169=169;a170=170;a171=171;a172=172;a173=173;a174=174;a175=175;a176=176;a177=177;a178=178;a179=179;a180=180;a181=181;a182=182;a183=183;a184=184;a185=185;a186=186;a187=187;a188=188;a189=189;a190=190;a191=191;a192=192;a193=193;a194=194;a195=195;a196=196;a197=197;a198=198;a199=199;a200=200;a201=201;a202=202;a203=203;a204=204;a205=205;a206=206;a207=207;a208=208;a209=209;a210=210;a211=211;a212=212;a213=213;a214=214;a215=215;a216=216;a217=217;a218=218;a219=219;a220=220;a221=221;a222=222;a223=223;a224=224;a225=225;a226=226;a227=227;a228=228;a229=229;a230=230;a231=231;a232=232;a233=233;a234=234;a235=235;a236=236;a237=237;a238=238;a239=239;a240=240;a241=241;a242=242;a243=243;a244=244;a245=245;a246=246;a247=247;a248=248;a249=249;a250=250;a251=251;a252=252;a253=253;a254=254;a255=255;a256=256;a257=257;a258=258;a259=259;a260=260;a261=261;a262=262;a263=263;a264=264;a265=265;a266=266;a267=267;a268=268;a269=269;a270=270;a271=271;a272=272;a273=273;a274=274;a275=275;a276=276;a277=277;a278=278;a279=279;a280=280;a281=281;a282=282;a283=283;a284=284;a285=285;a286=286;a287=287;a288=288;a289=289;a290=290;a291=291;a292=292;a293=293;a294=294;a295=295;a296=296;a297=297;a298=298;a299=299;a300=300;a301=301;a302=302;a303=303;a304=304;a305=305;a306=306;a307=307;a308=308;a309=309;a310=310;a311=311;a312=312;a313=313;a314=314;a315=315;a316=316;a317=317;a318=318;a319=319;a320=320;a321=321;a322=322;a323=323;a324=324;a325=325;a326=326;a327=327;a328=328;a329=329;a330=330;a331=331;a332=332;a333=333;a334=334;a335=335;a336=336;a337=337;a338=338;a339=339;a340=340;a341=341;a342=342;a343=343;a344=344;a345=345;a346=346;a347=347;a348=348;a349=349;a350=350;a351=351;a352=352;a353=353;a354=354;a355=355;a356=356;a357=357;a358=358;a359=359;a360=360;a361=361;a362=362;a363=363;a364=364;a365=365;a366=366;a367=367;a368=368;a369=369;a370=370;a371=371;a372=372;a373=373;a374=374;a375=375;a376=376;a377=377;a378=378;a379=379;a380=380;a381=381;a382=382;a383=383;a384=384;a385=385;a386=386;a387=387;a388=388;a389=389;a390=390;a391=391;a392=392;a393=393;a394=394;a395=395;a396=396;a397=397;a398=398;a399=399;a400=400;a401=401;a402=402;a403=403;a404=404;a405=405;a406=406;a407=407;a408=408;a409=409;a410=410;a411=411;a412=412;a413=413;a414=414;a415=415;a416=416;a417=417;a418=418;a419=419;a420=420;a421=421;a422=422;a423=423;a424=424;a425=425;a426=426;a427=427;a428=428;a429=429;a430=430;a431=431;a432=432;a433=433;a434=434;a435=435;a436=436;a437=437;a438=438;a439=439;a440=440;a441=441;a442=442;a443=443;a444=444;a445=445;a446=446;a447=447;a448=448;a449=449;a450=450;a451=451;a452=452;a453=453;a454=454;a455=455;a456=456;a457=457;a458=458;a459=459;a460=460;a461=461;a462=462;a463=463;a464=464;a465=465;a466=466;a467=467;a468=468;a469=469;a470=470;a471=471;a472=472;a473=473;a474=474;a475=475;a476=476;a477=477;a478=478;a479=479;a480=480;a481=481;a482=482;a483=483;a484=484;a485=485;a486=486;a487=487;a488=488;a489=489;a490=490;a491=491;a492=492;a493=493;a494=494;a495=495;a496=496;a497=497;a498=498;a499=499;a500=500;a501=501;a502=502;a503=503;a504=504;a505=505;a506=506;a507=507;a508=508;a509=509;a510=510;a511=511;a512=512;a513=513;a514=514;a515=515;a516=516;a517=517;a518=518;a519=519;a520=520;a521=521;a522=522;a523=523;a524=524;a525=525;a526=526;a527=527;a528=528;a529=529;a530=530;a531=531;a532=532;a533=533;a534=534;a535=535;a536=536;a537=537;a538=538;a539=539;a540=540;a541=541;a542=542;a543=543;a544=544;a545=545;a546=546;a547=547;a548=548;a549=549;a550=550;a551=551;a552=552;a553=553;a554=554;a555=555;a556=556;a557=557;a558=558;a559=559;a560=560;a561=561;a562=562;a563=563;a564=564;a565=565;a566=566;a567=567;a568=568;a569=569;a570=570;a571=571;a572=572;a573=573;a574=574;a575=575;a576=576;a577=577;a578=578;a579=579;a580=580;a581=581;a582=582;a583=583;a584=584;a585=585;a586=586;a587=587;a588=588;a589=589;a590=590;a591=591;a592=592;a593=593;a594=594;a595=595;a596=596;a597=597;a598=598;a599=599;a600=600;a601=601;a602=602;a603=603;a604=604;a605=605;a606=606;a607=607;a608=608;a609=609;a610=610;a611=611;a612=612;a613=613;a614=614;a615=615;a616=616;a617=617;a618=618;a619=619;a620=620;a621=621;a622=622;a623=623;a624=624;a625=625;a626=626;a627=627;a628=628;a629=629;a630=630;a631=631;a632=632;a633=633;a634=634;a635=635;a636=636;a637=637;a638=638;a639=639;a640=640;a641=641;a642=642;a643=643;a644=644;a645=645;a646=646;a647=647;a648=648;a649=649;a650=650;a651=651;a652=652;a653=653;a654=654;a655=655;a656=656;a657=657;a658=658;a659=659;a660=660;a661=661;a662=662;a663=663;a664=664;a665=665;a666=666;a667=667;a668=668;a669=669;a670=670;a671=671;a672=672;a673=673;a674=674;a675=675;a676=676;a677=677;a678=678;a679=679;a680=680;a681=681;a682=682;a683=683;a684=684;a685=685;a686=686;a687=687;a688=688;a689=689;a690=690;a691=691;a692=692;a693=693;a694=694;a695=695;a696=696;a697=697;a698=698;a699=699;a700=700;a701=701;a702=702;a703=703;a704=704;a705=705;a706=706;a707=707;a708=708;a709=709;a710=710;a711=711;a712=712;a713=713;a714=714;a715=715;a716=716;a717=717;a718=718;a719=719;a720=720;a721=721;a722=722;a723=723;a724=724;a725=725;a726=726;a727=727;a728=728;a729=729;a730=730;a731=731;a732=732;a733=733;a734=734;a735=735;a736=736;a737=737;a738=738;a739=739;a740=740;a741=741;a742=742;a743=743;a744=744;a745=745;a746=746;a747=747;a748=748;a749=749;a750=750;a751=751;a752=752;a753=753;a754=754;a755=755;a756=756;a757=757;a758=758;a759=759;a760=760;a761=761;a762=762;a763=763;a764=764;a765=765;a766=766;a767=767;a768=768;a769=769;a770=770;a771=771;a772=772;a773=773;a774=774;a775=775;a776=776;a777=777;a778=778;a779=779;a780=780;a781=781;a782=782;a783=783;a784=784;a785=785;a786=786;a787=787;a788=788;a789=789;a790=790;a791=791;a792=792;a793=793;a794=794;a795=795;a796=796;a797=797;a798=798;a799=799;a800=800;a801=801;a802=802;a803=803;a804=804;a805=805;a806=806;a807=807;a808=808;a809=809;a810=810;a811=811;a812=812;a813=813;a814=814;a815=815;a816=816;a817=817;a818=818;a819=819;a820=820;a821=821;a822=822;a823=823;a824=824;a825=825;a826=826;a827=827;a828=828;a829=829;a830=830;a831=831;a832=832;a833=833;a834=834;a835=835;a836=836;a837=837;a838=838;a839=839;a840=840;a841=841
```

Overview



a story

text-to-speech

An aerial photograph of Rome, Italy, showing the Colosseum and the surrounding ancient ruins like the Forum of Trajan and the Arch of Constantine. The city extends into the distance under a clear sky.

Overview

essential

accidental

easy

to understand
to explain
to reason about

taming complexity

essential for architecture

applicable for writing code

key to good abstractions

example

sorting algorithm

an algorithm that consists of a blend of non-parameterizable sort algorithms and heuristics, hand-tuned for performance, that can sort sequences of integers, and can be useful in other contexts

spaghetti code

A dark, textured background composed of numerous overlapping and illegible snippets of computer code in various colors (blue, green, red, yellow, orange). The snippets are oriented at different angles, creating a chaotic and tangled visual effect that represents the complexity of spaghetti code.



delicious pasta

@LucT3o

A background image showing a computer monitor displaying a massive, dense wall of multi-colored text, likely a programming language or script. The text is completely illegible due to its size and density.

spaghetti code



Coherence

2



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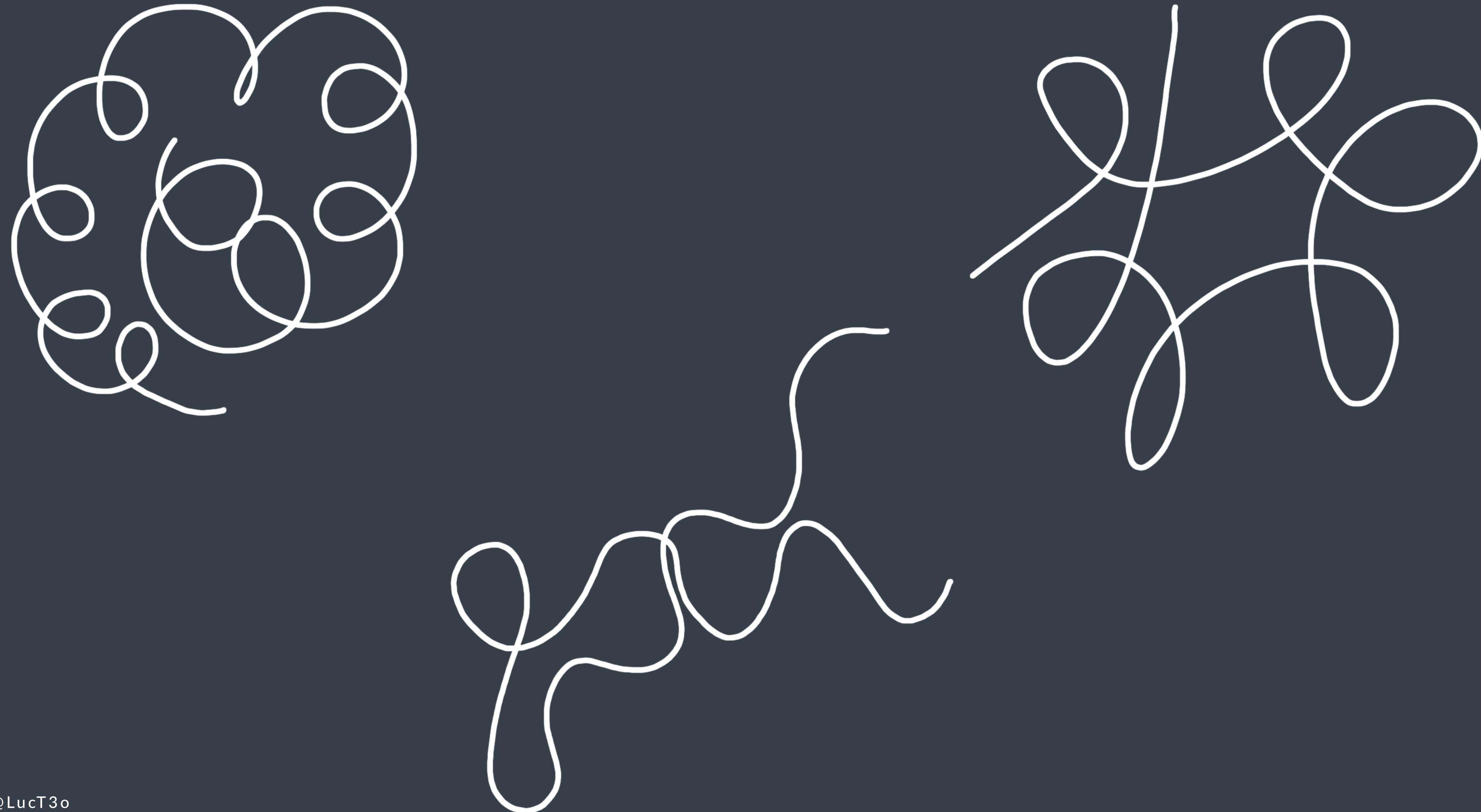




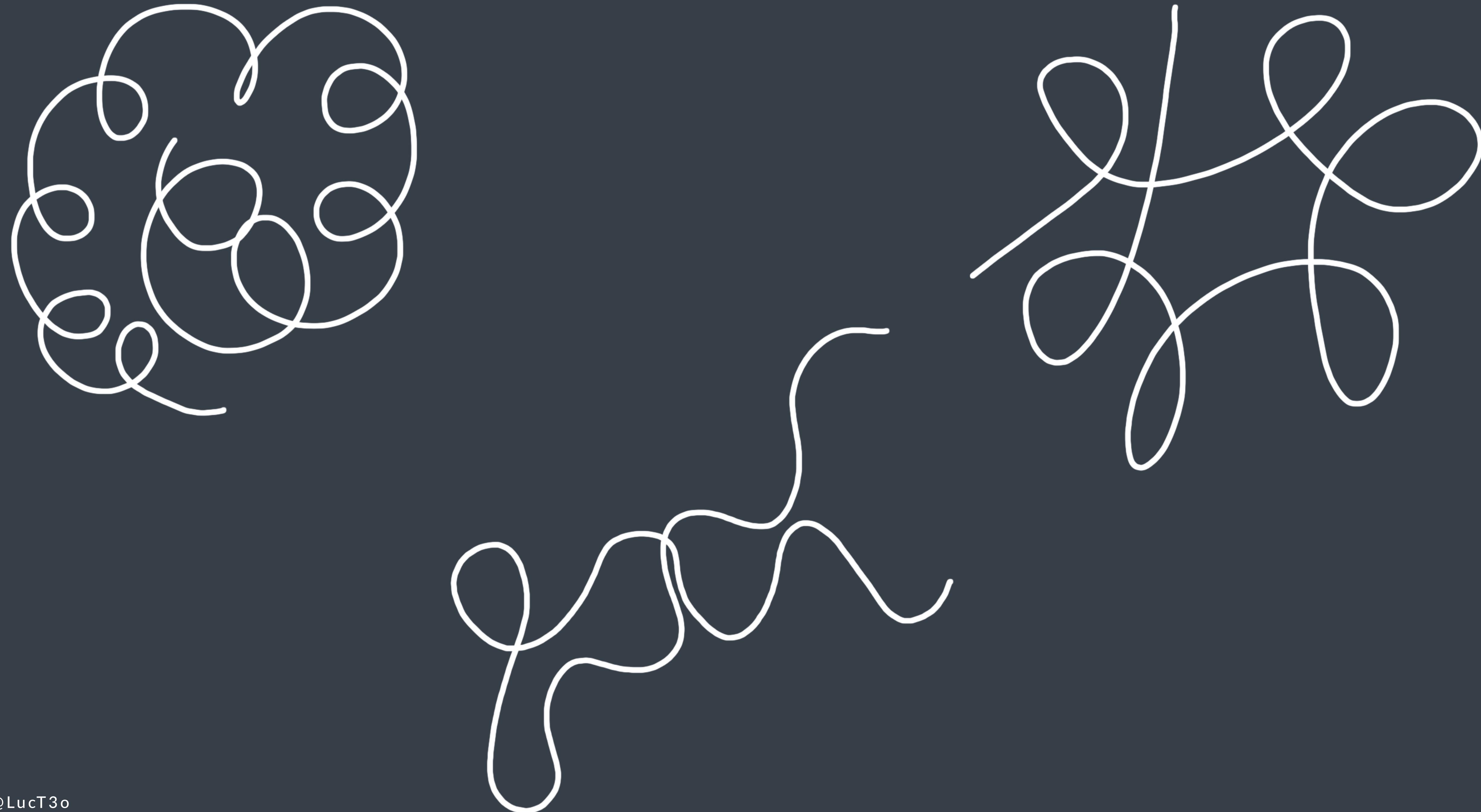
high cohesion

less to keep in mind











Balance



3





*pasta
bacon
Parmesan
cream
salt & pepper*

Virtue is the **golden mean**
between two vices,
the one of **excess**
and the other of **deficiency**

Aristotle



time spent in **problem analysis**

no analysis

analysis paralisis



time spent in **refactoring**

no refactoring

blind refactoring

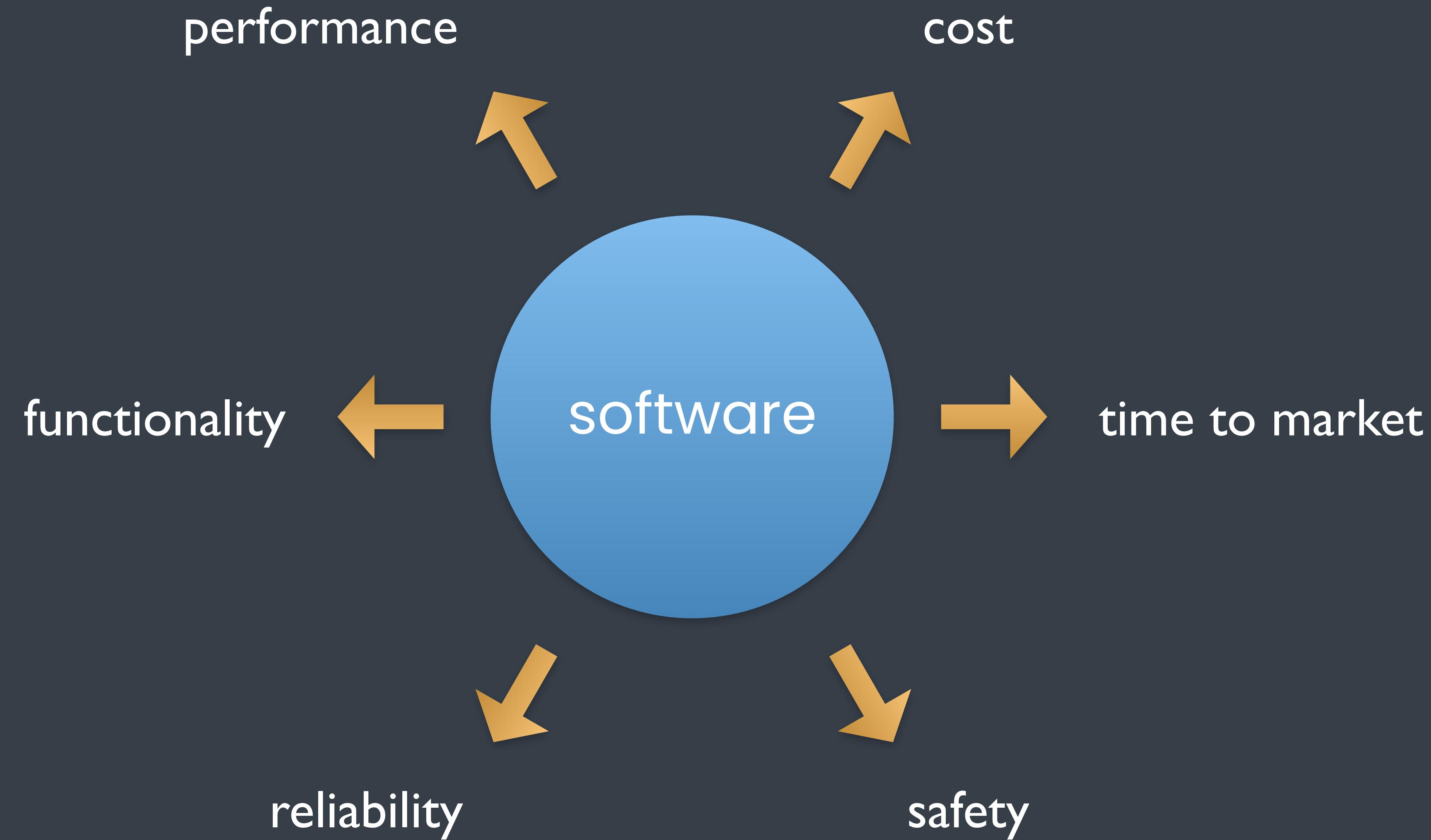


time spent with **performance**

no perf. improv.

chase irrelevant perf.





A collage of three food photographs. The top-left image shows a green salad with shredded lettuce and croutons. The top-right image shows a purple dish, possibly a fruit or vegetable salad. The bottom image shows a yellow pasta dish, likely spaghetti with meat sauce and cheese.

coherency

overview

balance

Thank You



@LucT3o



lucteo.ro

