Overview

Introduction

This is a list of questions at the middle of the semestre of the course Programming 1 - basics.

Authors of questions are anonymized with the help of the list of placeholders in different languages: List of placeholder names by language (Wikipedia).

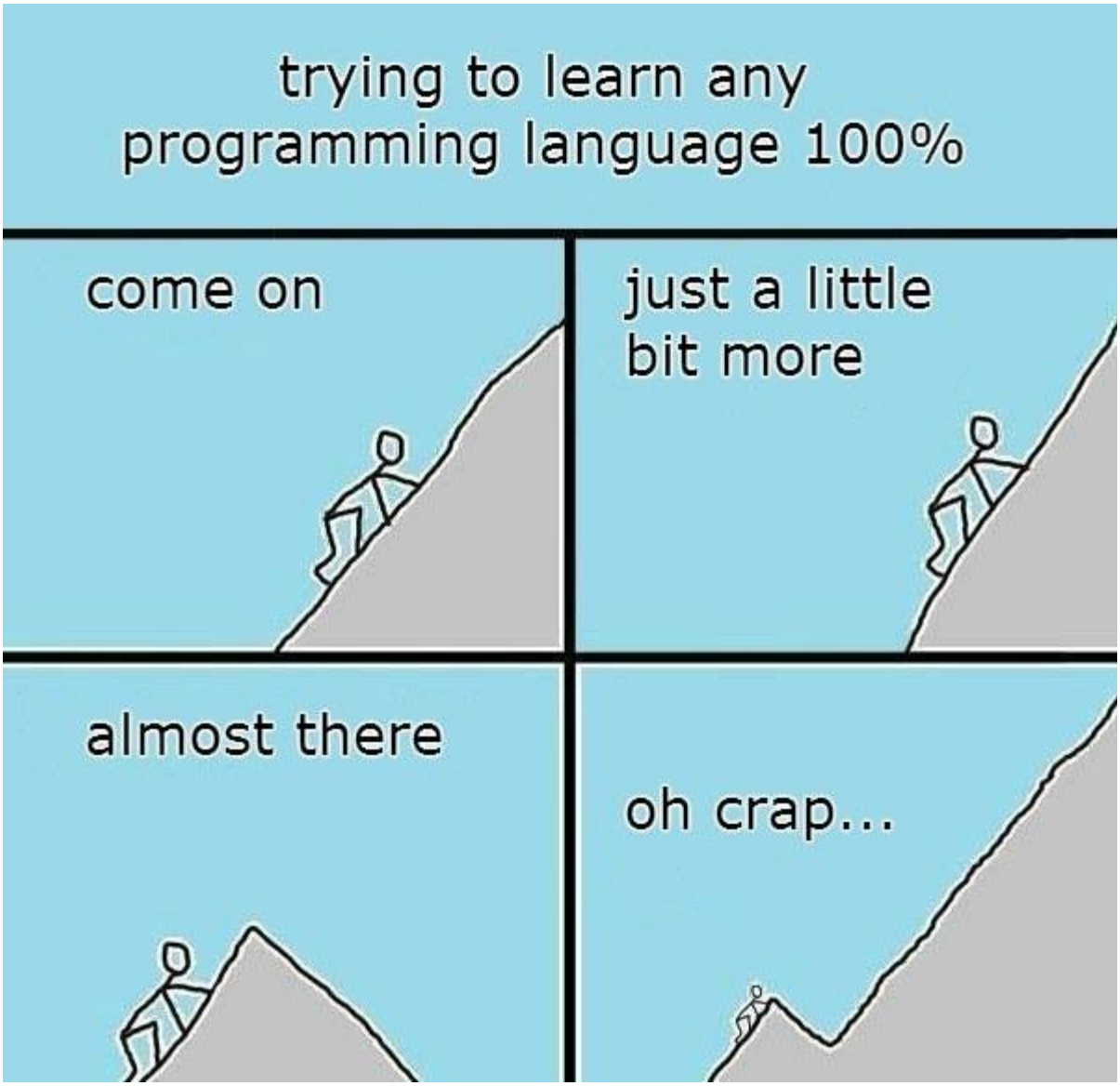

Illustration 1: Imgur (reddit)

Disclaimer

Disclaimer – The masculine form is used throughout the text for ease of reading, but refers to men, women and any other kind of unspecified, undefined sex (LGBTQ).

Kari Nordmann (Norwegian)

1. When to use float/double and int/long? I understand the difference since one is 32bit and the other is 64, but if double and long are better, why would we ever use int and float?
   1) space – smaller variables take less space – an array od 1M ints takes 4 MB, whereis the same array of long: 8MB
   2) speed: fetching less data from memory could mean les memory accesses.

Yannis Papadopoulos (Greek)

2. Can you explain attributes for methods like (static, public etc)?
   static – belongs to the class (not dinamically attributed to an object)
   public/private/protected – hiding methods and properties from unwanted access

Jón Jónsson (Icelandic)

3. What does String[] args mean, when and do we use something else instead?
   Each program can be started with a list of arguments. These arguments are stored in this array. See example ...

Seán Ó Rudaí (Irish)

4. When to use list and arraylist?
   List is an interface. You cannot make an object out of List. ArrayList in one of the classes that implements the interface List. You can olways look at thr ArrayList as a List.

Jonas Petras(Lithuanian)

5. What is Stack Overflow?
   Most of the answers to your programming questions can be found at this site.

Kovács János (Hungarian)

6. a) Is it optimal to use Java for 3D game developing or are other languages such as C# more optimal? b) If so, then is there a way to register collision of an object in space that is moving towards another object without checking their x,y(z) positions? Like a certain command that does it or is that not plausible?

a) No, the only well known game made in Java is Minecraft, and although one of the most played games of all times, it is not a pinnacle of 3D world experience :)
There are some 3D game dev environments for Java but not as popular as these two:
Please gave a look at Unity/Unity3D which is by my opinion the easyest toolkit for game dev.
If you want the best dev tool, there is Unreal Engine.
Please have a look at my (old) lectures: https://e.famnit.upr.si/course/view.php?id=2808 .

b) Collision detection is done using in an array of different ways, the easyest is “bounding boxes”. The bounding diamond, the minimum bounding parallelogram, the convex hull, the bounding circle or bounding ball, and the bounding ellipse.

Jean Dupont (French)

7. I do not understand exactly how the program reads numbers from arrays, for example, when you enter an arbitrary number into the program and the program prints the number of non-unique numbers. (insert numbers: 2,3,4,4,5, and the program should output that 4 numbers are unique). I had problems with finding the second greatest number also).

Have a look at BranjeStevilo!

Jan Kowalski (Polish)

8. Can you explain "Big O" notation?
O(n) = O(2n) > O(log(n))

9. When and where should we use trees?
SortedTreeMap O(log(n))

John Doe (English)

10.
```
public interface I{
    public void m1(String name);
```

}

Why do we use argument name in interfaces?

It is a placeholder. Using a name we can infer what the variable/parameter will be used for. In the implementation, we can use na different name for the parameter.

11. When and where should we use trees?

Lex and yacc

Matti Meikäläinen (Finnish)

12. I do not know how to get the second minimum number. I could get to the smallest, but I have no idea how to get one bigger.

13. In general, I have trouble declaring the arrays. I do not understand the basic logic. I did not know at the colloquium how to declare something for the array (I turned 3 rows until the thing worked). For example, when I see this code that we did on the exercises, it's logical for me, but when I need to get to the similar one, I only have a fog in front of my eyes.

```
System.out.println("Input numbers: ");
String line = b.nextLine();
String[] words = line.split(" ");
int[] p = new int[words.length];
for(int i = 0; i<words.length; i+= 3){
    p[i] = Integer.parseInt(words[i]);
}
```

14. I would like to get string and not integer from that example. Do you have to use split all the time? I get an error cannot convert from array to string.

A programer (Gažon)

15. Almost always, when I program, (I really like programming) the compiler sends me some error. What should I do in this case?

Good (that you like to programming)!

See Error.java!

16. I tried using force, but the program did not listen to me!. Of course, the experiment was quite costly. I am also interested in whether famnit is responsible for the damage to devices that happen making homeworks and quizzes?

You are not the first one, see Zmelkoow!
Even they were not the first:

Nova grafična računalnika

Intergraph, firma, znana po grafičnih delovnih postajah, je ponudila novo serijo grafičnih računalnikov, zasnovanih na močnem Fairchildovem procesorju clipper, ki dela na 25, 33 ali 40 MHz. Interpro 32C ima zaslon ločljivosti 1184 × 884 z 32 od 4096 barv, medtem ko ima Inter Act 32C dva takšna zaslona za interaktivno delo. Pri firmi trdijo, da sta ta računalnika 5 do 8-krat močnejša od VAX 780. Oba dobavljajo z gibkim diskom 1,2 Mb in trdim diskom z 80 Mb (po želji še več), imata pa 6 do 16 Mb pomnilnika.

Štirikrat hitrejši od čarlija

Datavue Technical Systems prodaja 8612. To je računalnik z eno ploščo, združljiv z IBM PC, izdelan okrog procesorja NEC V 30 (10 MHz, sicer ekvivalenten 12 MHz 8086), brez čakalnega stanja pa je štirikrat hitrejši od izvirnika in pol hitrejši od AT. S tem procesorjem prodajajo tudi Datavue PC. Cena je 995 dolarjev s 512 K RAM, monokromatskim monitorjem, Herculesovo kartico, enim gibkim diskom in tipkovnico AT. Informacije: Datavue Technical Systems, P. O. Box 2687, Norcross, GA 30093, USA.

C64 v merilni tehniki

Z dodatkom MAC 64 nizozemske firme Maris Electronics boste svojemu mikru dodali sedem analognih in digitalnih merilnih instrumentov. Logični analizator (logic time analyzer) ima osem kanalov s po 5 MHz in uro. Osciloskop ima dva kanala z največjim vzorčenjem 100 kHz v treh načinih. Frekvenčmeter premore območja 500 kHz / 5 MHz z digitalnim in analognim vhodom. Tu so še funkcijski generator, vzročni (pattern) generator, dvokanalni voltmeter itd. Dodatek dobite kot ROM modul in zraven ne potrebujete disketne enot. Takoj ob zagonu je na voljo vseh sedem instrumentov. Kontrolni program je napisan v strojnem jeziku, vendar se da sistem spreminjati in nadzirati tudi iz basica. Cena ustreza 320 dolarjem. **Maris Electronics,** Arnhemseweg 27-B, 7331 BB Apeldoorn, The Netherlands.

VAXE ubijajo, mar ne?

IBM na miniračunalniški sceni očitno ni tak strah in trepet drugih proizvajalcev, kot to velja za mikroračunalnike. Se več, izdelki te firme so znani kot nestandardni. Ena od posledic takega stanja je 153-odstotni skok dobička neposredne konkurence – DEC. Druga posledica je t. i. VAX – buster (VAXomor). Novi stroj IBM je menda mini izvedba prastarega 370. Njegovo pravo ime je IBM 9370. Ima 24-bitni procesor, 4 Mb pomnilnika in zmore 0,5 MIPS – cena pa je 100.000 funtov. Proizvajalec žal ni poskrbel za primerjavo z ST, ki ponuja več za 98.451 funtov manj. Na mikro področju ne gre nič boljše. Delovno ime Renegade skriva tri nove mikroračunalnike. Eden od teh je zasnovan okoli 8086 in sploh podoben PC 1512, le da stane dvakrat toliko (800 funtov). Ta stroj naj bi pokopal cenene klone. Zdaj, ko se Big Blue pripravlja za 80.386, padajo cene drugih njegovih izdelkov – predvsem bi se radi znebili starih strojev z 8088.

Grafika tudi brez GS

Če imate apple II (+, c, ...) in bi radi uporabljali visoko ločljivost, ni treba, da stroj prodate in ga nadomestite z IIGS. XOR Systems vam bodo za 300 dolarjev prodali MegaPix, kartico, ki premore 16-bitni grafični procesor, 128 K RAM (do 512 K), vezje za sestavni video, TTL-priključek in razširitvena vrata, na katera boste priključili dodatke za barvo, ko bodo na voljo. Trenutno lahko kupite le monokromatsko verzijo z ločljivostmi od 600 × 200 do 1024 × 1024 točk. V mikro lahko vtaknete do šest takih kartic. Softver dobite zraven. **XOR Systems,** 986 Live Oak Dr., Santa Clara, CA 95051, USA.

Kdor ima takšne prijatelje ...

Perihelion (VB) nepoveduje v roku enega leta stroj, ki naj bi povzel amigo s ceno pod 1000 funtov, 1 Mb RAM, 10 MIPS, trdim diskom in grafiko 1280 × 960 točk. Pri projektu sodeluje dr. Tim King, ki je nekoč napisal TriPos, ta pa se je kasneje pretvoril v AmigaDOS. Dr. King je pred kratkim zapustil Metacomco.

Popolna združljivost

Vas je že kdaj popadla želja, da bi ročno razbili računalnik ali vsaj disketno enoto ali tipkovnico? Morda samo takrat, ko ste izgubili pomembno datoteko ali pa šele potem, ko vas je računalnik premagal v šahu.

Vaše destruktivne nagone popolnoma razumemo. Računalnik večkrat zasluži, kar mu gre. Kar pošteno ga mahnite po glavi z Byte batino. Byte batina (499,95 din) je namenjena vsem računalnikom od hišnih preko poslovnih do velikih z množico terminalov. Združljiva je z vsemi operacijskimi sistemi. Uporabljate pa jo lahko tudi na delovnem mestu, saj je lahko prenosljiva.

Byte batina pomaga pri frustracijah ali globokih depresijah, ki so povezane z vašim računalnikom. Za nameček pa povzroča bistveno manj gospodarske škode od klasičnih, tako imenovanih Hard batin.

Byte batino lahko naročite na naslov: **Moj mikro, Oddelek radostne destrukcije, Titova 35, 61000 Ljubljana.**

Pri Commodoru so pohiteli ustavljati povodenj in sprožili proces (pred sodnika še niso šli), da bi ugotovili, ali ima Tim pravico, da sam trži OS, ki jih je napisal. Lahko se namreč izkaže, da je Tri Pos ali kakšna njegova varianta temeljni kamen bodočega mikra. Če namreč nekdo napove nov računalnik v enem letu, mora biti hudo prepričan, da bo imel do takrat zanj napisan tudi OS. Vprašanje primata je posebej kočljivo zdaj, ko mnogi pričakujejo, da bo IBM zapustil standard, ki ga je bil ustvaril. Med sabo se bijejo stroji z 68 ... in 80386 in nove konkurence gotovo nihče ne bi maral. Amiga = prijateljica ...?

OS za 80386

Tudi Jarogate je predstavil mikro okoli lega procesorja. Še vedno pa zanj ni moč dobiti operacijskega sistema, ki bi se ga kasneje vsi bili pripravljeni držati. Najbrž bo Microsoft svoj MS-DOS 5 dokončal pozno (18 mesecev) ali nikoli. Se dobro, da je tu Software Link Inc. iz Atlante (Georgia, ZDA). Februarja 1987 nameravajo začeti s prodajo lastnega sistema PC-MOS/386. Ta se baje obnaša podobno kot MS-DOS. Ali to pomeni zgolj podobnost uporabniškega vmesnika ali pa gre za pravo združljivost, ni znano. Začasno mikri s 386 uporabljajo Xenix V/286, ki naj bi prav tako pomladi postal V/386.

Novi paketi za Amstrad/Schneider

Čeprav se je Amstradov PC podražil za 25%, znani proizvajalci programske opreme še zmeraj predstavljajo uspešne programske pakete v ceneni verziji za Amstrad/Schneider. Tako potezo je napravil tudi Ashton-Tate, ki bo kmalu dal na trg dBase II in Framework v malce oskubljeni, zato pa bistveno cenejši verziji. Najprej bosta proizvoda naprodaj v francoski, nemški in nizozemski verziji, kasneje pa še v kakšni drugi. V nobeni državi pa ne bosta stala več kot 200 dolarjev.

Kompatibilnež s perjanico

Indijanci Navajo so nam znani iz filmov o Divjem zahodu in iz kavbojskih romanov Karla Maya ali Zana Greya. Poskrbeli pa so, da o njih govorijo tudi v računalniških krogih. Sklenili so namreč kupiti kalifornijskega proizvajalca AT kompatibilnežev Business Interfacing Technology, ki že načrtuje lasten, na 80386 temelječi sistem, ki naj bi prišel na trg v tretjem četrtletju leta 1987.

AT kompatibilnež je zgrajen okoli osnovne plošče iz Tajvana in BIOS znanega proizvajalca Phoenixa, vdelanih ima 640 K RAM, 1,2 Mb disketni pogon, s Herculesom kompatibilno monokromatsko kartico, 20 Mb trdi disk in monokromatski monitor. Tako opremljena zadeva stane 2.495 dolarjev.

Da je lastnik BIT svoje podjetje prodal Indijancem, pa sploh nima priokusa po sicer znani ameriški ekstravaganci. V zadju je jasna poslovna prednost. Ker ima podjetje v lasti narodnostna manjšina, po ameriških zakonih lahko konkurira za državna naročila. Po drugi strani pa podjetju ni treba plačevati carine, saj za pleme ne veljajo ameriški trgovinski predpisi.

17. I also wonder why I should always write semicolon at the end of a line? Ok, sometimes I know it's not necessary, but generally?

Javascript

See StackOverflow!

18. Why do I get 1001 warning when I click on the green button? How can I get rid of the warnings. The code works, why do I need to care about warnings.

See Makefile, *.cpp!

张三(Simplified Chinese) - Zhang San

19. What does `::new` mean?

```
new String[0]  String[]::new ?
```

Lambda Expressions were added in Java 8.

A lambda expression is a short block of code which takes in parameters and returns a value. Lambda expressions are similar to methods, but they do not need a name and they can be implemented right in the body of a method.

```
parameter -> expression
```

To use more than one parameter, wrap them in parentheses:

```
(parameter1, parameter2) -> expression
```

Usage:

```
import java.util.ArrayList;

public class Main {
  public static void main(String[] args) {
    ArrayList<Integer> numbers = new ArrayList<Integer>();
    numbers.add(5);
    numbers.add(9);
    numbers.add(8);
    numbers.add(1);
    numbers.forEach( (n) -> { System.out.println(n); } );
  }
}
```

Back to your question …

:: is called Method Reference. It is basically a reference to a single method. I.e. it refers to an existing method by name.

These two lines produce the same result:

```
class Hey {
    public double square(double num) {
        return Math.pow(num, 2);
    }
}
Hey hey = new Hey();
Function<Double, Double> square = hey::square;
double ans = square.apply(23d);
```

::new is used to pass the instance of the class. So in most cases there is no difference from Foo::new and foo = new Foo().

Pera Perić(Serbian)

20. What is with the Ackermann function!? I filled more than 10 pages and still did not find the solution!

See Ackermann.java!

(فلان الفلاني)(Arabic) - Fulan AlFulani

21. On the hakerrank site I solved the task where you have to list all the items in the list. I was not very successful, so I would ask if I could explain the lists again and how to write the methods that regulate or change the list.

We will!

22. Can we do an example of inheritance, abstract classes and interfaces!

Janez Novak (Slovene)

23. Recursion (I get the basic idea, but when it comes to the actual implementation, I freeze). Can we do a new example?

See Hanoi.java!

24. Functions (when we define new functions, how do we state the accessibility property public or private?

OK!

Jožko Mrkvička (Slovak)

25. Can we make the palindrome example again?

See Palindromi.java!

Jan Novák (Czech)

26. I wonder how to build a 'function' that returns an array of size m*n. So, how do we write the program, so that it returns the size of the array. The idea behind the task is that the user chooses the size of the array. Alternatively, we can play and select random sizes for m and n.

See VelikostPolja.java!

Mujo Mujić (Bosnian)

27. Could we do something mathematical? I got problems in the small homework doing the binomial coeficients and the quiz Ackermann function. I had no idea how to write a program that solves the Ackermann function?

Jan Kowalski (Polish)

28. What does :: new mean?

new String[0] String[]::new

29. What are Vector legacy methods?

Earlier versions of Java did not include the Collections Framework. Only in from version 1.2, you could actually use this Legacy class. In this, the original classes were reengineered to support the collection interface. These classes are also known as Legacy classes. All legacy classes and interfaces were redesigned by JDK 5 to support Generics.

Anders Andersen (Danish)

30. Because your area of work and knowledge is science, by now, in your professional experience, has it been easier for mathematicians to solve and translate the problems in a programming language or has it been easier for programmers to solve a particular mathematical problem?

- In the first year we are not solving any major world problems …
- Math …
- CS …

Иван Петрович Сидоров Ivan Petrovich Sidorov (Russian)

31. Which are the similarities with Java in objected-oriented programming and C++?

- Syntax
- Abstract OOP blocks are the same
  - Class,
  - object,
  - property,
  - method,
  - class hierarchy.

Zé da Silva (Portuguese)

32. According to you, does something like 'intuition' exist in the world of programming? If the answer is yes, could you briefly explain it?

- Let's look at this blog: https://rrees.me/2011/04/03/intuitive-versus-reasoning-programmers/

João da Silva (Brasil)

33. If a program is meant to perform multiple tasks (ex. the 1st Project), is it better to have a separate method for each task, have separate classes that handle one or more tasks or have everything in main method? Is it just a programmer's preference or does it depend on the situation?

A class should encapsulate the tools that are used to achieve similar goals (for example a set of methods that deal with arithmetic). A class is used to encapsulate the methods and data and define/allow the usage as the author imagined/planned it.

For the first project, I would suggest 2 classes, one that has all the methods that deal with the array and one class that uses these methods on the input array from the user.

34. What is the easiest way of reusing our old code? How should our code be written so that it is most convenient for reuse?

Classes with interfaces and inheritance are used for code reusal. Plan how your method can be reused in some other cases. In the project you had to prepare a method that checks if a number is palindrome a few times. If you implemented this as a method all you needed to do was to start the method with different parameters.

35. Should an interface be useful even if we are working alone?

Yes. Your code usage is better documented and later it can be reused as you defined the interface – how he methods should be used.

36. How detailed the contracts should be? Should the contract just say what a method does or explain how it works? Are the contracts enough or should we explain each block of the method by putting comments?

Not very detailed. Less is more is by my knowledge and preference the best way. Describe everything but briefly and in a simple structured way. The contract defines how the method must be used, you should use comments to describe what parts of your code do for yourself as you will be going through your code later (in our case when presenting to the assistant, but in general you will probably you code maintainer.

37. When the result can’t be defined by a mathematical formula should we say the result is? (example program that prints “Hello world”, is the result “prints a string” or “Hello world”, what about methods that just return some value and print nothing?)

If a method does not return anything, you do not need to explain this (remember less is more), if a method prints something, this is not a method result, it is a method's action. If you cannot explain something with a math formula, use simple structured language.

38. If a method doesn’t require any conditions to be met before running should we still keep the “pre: “ and “post: ” sections in our contract or is that not necessary?

Omit unusable parts or write something like pre: / . I have no preference in this case.

Numerius Negidius (Latin)

39. What are trees most basically used for in Java?
40. What about Vector and ArrayList?

- Let’s have a look at the next lecture ...