

# Anvendt Programmering

2012

Uge 1

Torsdag

# Dagens tekst

Programmering og Molekylærbiologi

Hvad er programmering?

Anvendt programmering

# Programmering og moleylærbiologi

# DNA sekventering

1970: DNA sekventering mulig

1977: Den første hele genom for en bakterie (5kb)

2001: Det menneskelige genom (3Gb) - ti år

2008: High-throughput sequencing - 14 dage

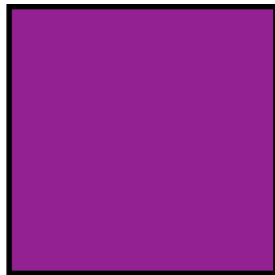
2012: High-throughput sequencing - 1 dag

2013: Nanopore sequencing? - 15 min?

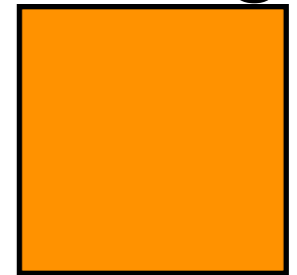


# Molekylærbiologi og Datalogi for 20 år siden

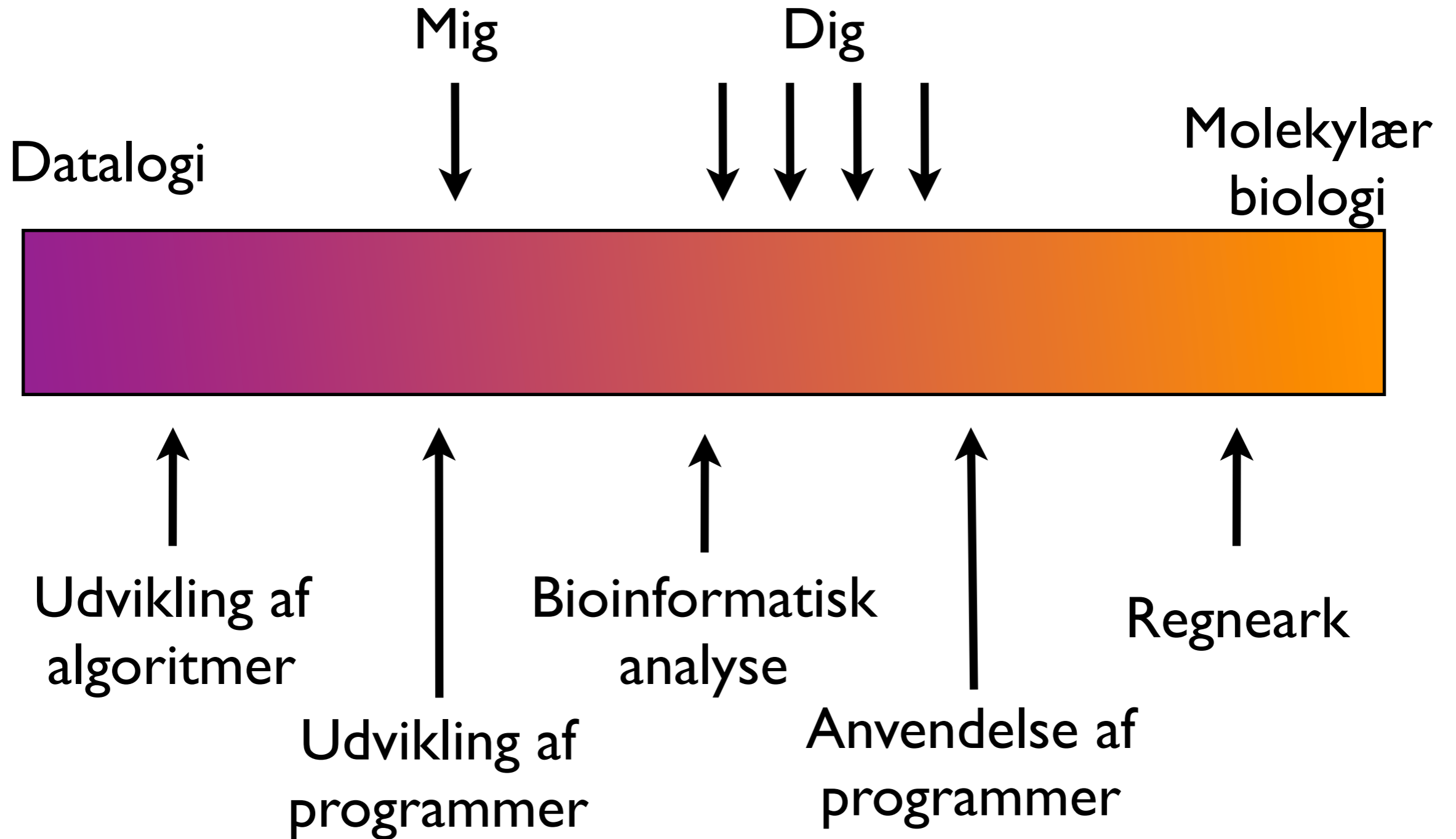
Datalogi



Molekylær  
biologi



# Molekylærbiologi og Datalogi idag





# Typiske programmeringsopgaver

Simple data analyser

Beregninger

Omformatering af store data filer

Analyse pipelines

Instruktion af erfarne programmører

“Tweaking” af eksisterende programmer

Hvad er programmering?







# Computer sprog - programmering

## Menneske sprog

- subjektive mål (mange)
- begreb (ferskenfarvet)
- fortolkning forventes

## Computer sprog

- eksakte mål (4)
- Sandt eller falskt
- ingen fortolkning

# Hvordan instruerer man en computer?

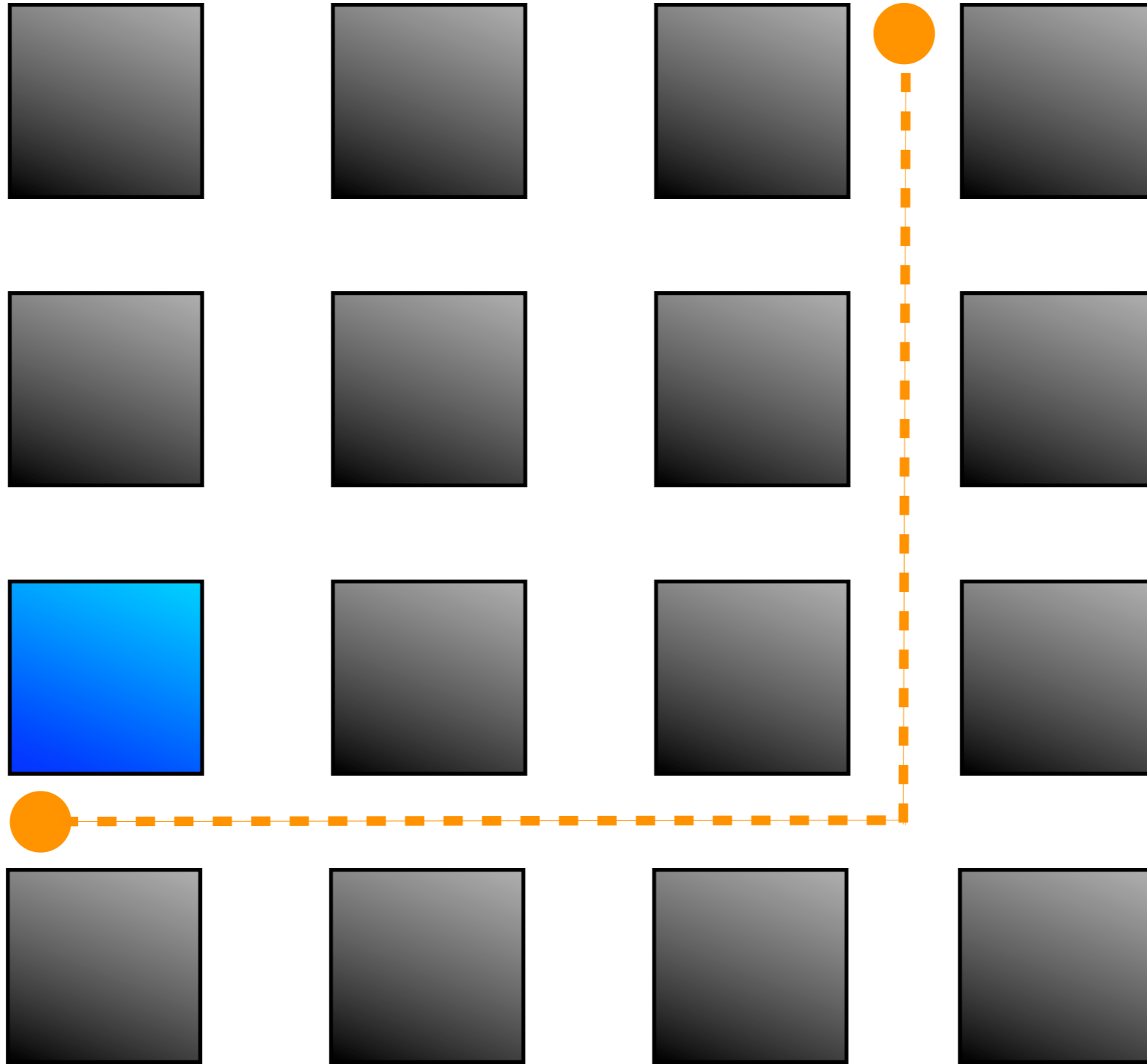
Simple instruktioner:

- f.eks. træk 7 fra!

Sandt/Falsk spørgsmål:

- f.eks. er  $x$  større end  $y$ ?

start





# Udfordring

I har en ukendt værdi større end to.

Find end måde at ændre værdien til to - kun ved hjælp af sandt/falsk spørgsmål og instuktionen "træk en fra".

Snak med din sidemand/kvinde.

```
if x > 2:
    x = x - 1
if x == 2:
    print "Jubii x er nu 2"

...
```

# Anvendt programmering 2011

# Læringsmål

Beskrive entydige og udtømmende fremgangsmåder til løsning af simple opgaver.

Anvende Python programmeringssproget til løsning af simple programmeringsopgaver.

Læse Python kode produceret af andre og tilpasse denne til eget formål.

Skitsere et programs udformning for en professionel programmør.

# Valg og fravalg

Python - de grundlæggende elementer.

Begrænset mængde stof - vægt paa anvendelse.

Simplicitet vs. realisme i øvelserne.

Dansk/Engelsk materiale + undervisning.

# Mine forventninger til jer

Learning by doing - and failing.

Spørg - dumme spørgsmål er tilladt.

Vær modig, tag initiativ, prøv ting af.

Tag egen computer med til forelæsningsne.

Lyt *eller* programmer - forståelse er bedre end noter.

Løs *alle* opgaver og øvelser - læringskurven er stejl

Applied programming 2012

users-cs.au.dk/kmt/AP2012/index.htm

Galaxy UCSC at moma Ordbogen.com - WAYF Random Databases Open in Papers Documentation Send to OmniFocus Oracle

| [Front page](#) | [Index page](#)

# Applied programming 2012

This course introduces basic Python programming to students with little or no experience with programming. After the course, participants will know the basic principles behind programming and will have sufficient experience with practical programming to tackle simple programming tasks.

## Lectures

Lectures are in Danish. Web resources are in English for the benefit of our foreign students. Your lecturer is Kasper Munch. You can contact him on email ([kaspermunch@birc.au.dk](mailto:kaspermunch@birc.au.dk)) or on phone (89423132).

| Day      | Time    | Place                                  | Weeks |
|----------|---------|----------------------------------------|-------|
| Tuesday  | 9 - 11  | Auditorium G1 (building 1532 room 116) | 45-51 |
| Thursday | 10 - 11 | Auditorium G1 (building 1532 room 116) | 44-50 |

## Computer exercises

Each week you can meet with your TA to go through the computer exercises presented to you. Your teaching assistant (TA) will be Andreas Sand Pedersen ([asand@cs.au.dk](mailto:asand@cs.au.dk)), Yu Qian ([qianyuxx@gmail.com](mailto:qianyuxx@gmail.com)) and vikas gupta ([vikas0633@gmail.com](mailto:vikas0633@gmail.com)). After each TA session the solutions to the exercises will be available at the end each page with exercises.

| Day    | Time    | Place                | Weeks |
|--------|---------|----------------------|-------|
| Monday | 12 - 15 | Stibitz-123, Åbogade | 45-51 |
| Friday | 8 - 11  | Stibitz-123, Åbogade | 44-50 |

## Weekly assignments

Each week you will be assigned a mandatory assignment that you should hand in to your TA. You should hand it in by Wednesday at 10 the week after it is assigned and he/she will correct it and give you feedback at the TA session the following Friday.

**All** the weekly assignments must be handed in - **and** accepted by the TA - for you to qualify to take the exam.

## Reading material

The reading material for this course will mainly be notes put up on these pages as part of the weekly schedule. I will point you to online resources for additional reading along the way. You will be just fine with that, but if you absolutely need a real book on Python you can buy [Dive Into Python](#).

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- [Weekly schedules](#)

**Contact info**

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<http://users-cs.au.dk/kmt/AP2012>

# Kursusplan

| <b>Week</b> | <b>Double lecture</b>                        | <b>Single Lecture</b> | <b>Exercise</b>                                              |
|-------------|----------------------------------------------|-----------------------|--------------------------------------------------------------|
| 1           | Introduction, Expressions, If statements     |                       | Installation, IDLE, Expressions, If statements               |
| 2           | Control flow, Functions                      | Functions, Modules    | Control flow and Simple functions                            |
| 3           | Strings, Lists                               | Scope                 | Comparing HIV sequences                                      |
| 4           | Dictionaries, Files                          | Aliasing              | Base composition if HIV sequences, Reading and writing files |
| 5           | Breaking down problems                       | List comprehensions   | Finding open reading frames in Streptococcus bacteria        |
| 6           | Classes and objects                          | Debugging             | Calculating codon bias, Trouble shooting                     |
| 7           | Programming techniques, data structures      | TBA                   | TBA                                                          |
| 8           | Wrap up, Exam, Bachelor projects, Evaluation |                       |                                                              |



# Feedback

Ugentlig anonym evaluering  
To hold-representanter

## Evaluation week 1

### Questions

\* Required

Mention one thing about the course that stands out as especially positive. \*

Mention one thing about the course that could be improved \*

How much time did you spend on this course compared to your other courses this week? \*

1 2 3 4 5

Much less      Much more

How difficult was this weeks material? \*

1 2 3 4 5

Very easy      Very difficult

Submit

# Vigtigt!

I skal selv sørge for at være tilmeldt eksamen!

I skal være tilmeldt kursussiden på AULA for at kunne få beskeder om kurset og eksamen:

<http://aula.au.dk/courses/AP2012/>