I. How to compile

1. The project was originally created in C++ in Visual Studio 2017 and is now maintained in Visual Studio 2022 (you can get it free for academic purposes).

2. To compile it successfully, please run the compilation on *Release* and on *x64*

3. The main project is IslandGA (use the "Set as startup project" option)

4. If you are using Visual Studio 2022 or higher, then you will be asked to retarget solution. If this happens, then give the environment the following answers. Considering our own experience, the crucial part is to **reject upgrading the toolset**.

Retargetting solution:
Platform SDK: **10.0.183620**
Platform toolset: **No upgrade**

II. How to execute

1. The examples of how to run considered methods by hand are given in "run me yourself" folder.

2. To run experiments, you need to:
   - Put *IslandGA.exe*, *zobristkey, default* and settings file in one folder (except the settings file you can find the rest in folder *x64/Release*).
   - To run an experiment, you need the following settings files that are in settings zips
   - Once you have all the necessary files you run your command-prompt console (you can type *cmd* to your system search box) go to the folder containing *IslandGA IslandGA IslandGA.exe* and the settings files. Then, just type:
     - "**IslandGA.exe 0**" to run the experiment using the *0_entry.txt* entry file
     - "**IslandGA.exe 1**" to run the experiment using the *1_entry.txt* entry file
     - and so on…

3. More information about executing the experiments you can find in the folder that is a part of the source code: *zz_introduction\00 run me yourself\readme.doc*

4. In folder "settings\zz_execute_example" you will find a compiled exe file and all other necessary files to run the program.

5. In folders *"00_artificialNoise"*, you will find all the necessary setting files to repeat our research. For instance, to execute an experiment defined in in file *"settings_DepVer_WalshPure__binKnnFeatureSel_gener___onemax_10__onemax_10_000.txt__uniFile_0.txt"* (folder *"00_artificialNoise\WalshPure_1_00\binKnnFeatureSel\gener___onemax_10__onemax_10_000.txt__uniFile"*) you have to create a *0_entry.txt* file with the following text inside:

"settings_DepVer_WalshPure__binKnnFeatureSel_gener___onemax_10__onemax_10_000.txt__uniFile_0.txt

"

Make sure to put an <enter> after the name of the settings file. An exemplary entry file you can find in the source code pack in folder *"zz_introduction"*.

Then, as described above you copy-paste the exe file (and the *zobrsitkey* and *default* files) from the *"\00_artificialNoise__program"* folder to the folder with the settings file

Finally, you execute from the command window: "**IslandGA.exe 0**"

6. Folder *"00_artificialNoise"* contains experiments concerning the dependency discovery in the artificial onemax instances with noise. Subfolders *WalshPure*, *WalshPure_1_00*, etc. contain detailed results for subsequent *nVol* values. Summarized results you can find in the *__results* folder.

7. Folder "01_exp_binary features metrics" contains detailed results of experiments considering denoising the real-world instances. For each run, the curves that are presented in Figures 2 and S-1 can be reproduced using the files with name ending with*"_walsh_opts_Limited.txt"*.

8. The runs decomposing the real-world instances were long and their result files are large. Therefore, we share them in the separate zip file available at https://drive.google.com/file/d/1ys1AbHipBtdYxkFFrswLKh6PZJ9Wg-6a/view?usp=sharing

   For each experiment, the coefficients that were used by the denoised surrogate are listed in the files ending with *".txt_walsh_coeff.txt"*.

9. The settings files for the main experiments runs are in the *"02_main_experiments"* folder

Thank you for downloading our source codes and paying attention for our research. In case of any problem, please do not hesitate to contact us using the following email michal.przewozniczek@pwr.edu.pl.

Michal Przewozniczek